# SOUTHWEST WYOMING

# Resource Evaluation Report

## and Recommendations

99-020675

U.S. Department of the Interior
Bureau of Land Management
Wyoming State Office

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United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Wyoming State Office
P.O. Box 1828
Cheyenne, Wyoming 82003-1828

In Reply Refer To:

1614 (930)

Dear Reader:

Attached for your information is the report and recommendations resulting from the Southwest Wyoming Resource Evaluation, a 3-year review by the Bureau of Land Management of activities related to Federal minerals development in all or parts of Carbon, Fremont, Lincoln, Sublette, Sweetwater, and Uinta Counties. The purpose of the evaluation was to assess the need for a programmatic environmental impact statement on energy and mineral development in southwest Wyoming.

The report was prepared by an interdisciplinary team of BLM specialists. Prior to accepting the report and its recommendations I would appreciate your input. The overall recommendation being made in the report is that, *"Preparation of a programmatic cumulative environmental impact assessment of energy and mineral development activities in southwest Wyoming is not necessary."* If you have any data not portrayed in this report that would influence that recommendation, I would like to hear from you. Please address your input to:

Bureau of Land Management
Wyoming State Office
Attn: Roger Wickstrom, SWRE
P.O. Box 1828
Cheyenne, WY 82003

We plan to host several public information meetings about the evaluation in the near future and will advise you of times and places. If you or your organization would like to have a presentation or a discussion about the evaluation report at your convenience, please contact Mary Apple at the Rawlins Field Office (307) 328-3329.

Please submit your input to the BLM at the above address by February 8, 1999.

Additional copies of the report are available from Roger Wickstrom at (307) 775-6106.

Sincerely,

Alan R. Person

Alan R. Person
State Director

# EXECUTIVE SUMMARY

## BACKGROUND

In February 1995, the Wyoming Bureau of Land Management (BLM) initiated the Southwest Wyoming Resource Evaluation (SWRE), a comprehensive three-phase evaluation of its land use planning decisions, impact predictions, and National Environmental Policy Act (NEPA) analyses for the southwest Wyoming area.[1] Rapid growth in natural gas exploration and drilling in this area has raised concerns about both the developments' impacts upon other public land resources and uses (e.g., grazing, wildlife, fisheries, recreation, cultural) and the adequacy of the present BLM environmental analysis/project approval process. A cumulative impact assessment or regional EIS of energy and nonenergy development activities in southwest Wyoming has been suggested as a necessary requirement of NEPA. The primary objective of the SWRE is to determine if such an analysis is necessary.

Phase One of the SWRE involved the gathering of existing data and the compilation of the following reports: Planning, NEPA Analysis, Landtype Delineation, Socioeconomic Analysis, Cultural Resource Data Management and Context, Issue Identification, and Existing Data Sources. This Phase Two Report consists of the summary, review, and analysis of the Phase One information. The analysis revealed some technical and procedural gaps within BLM's various resource programs. The Phase Two report includes recommendations to correct or improve these conditions.

From its analysis of the Phase One information, BLM determined that oil and gas-related decisions in the four SWRE resource management plans (RMP) were uniformly consistent with only minor technical differences in the application of mitigation measures. BLM concludes that its current methods and practices of both assessing impacts from oil and gas development in southwest Wyoming and complying with NEPA are reasonable and appropriate. Therefore, a cumulative impact assessment or regional EIS is not warranted.

## CHAPTERS TWO, THREE, and FOUR

Each chapter includes analyses, conclusions, and recommendations regarding various aspects of their respective subjects. Chapter Two explains the evolution of BLM's land use planning process, summarizes the Phase One Report on land use planning, and briefly describes BLM's oil and gas leasing process. It also describes and compares the RMPs for the four resource areas covered by the SWRE.

Chapter Three includes an explanation of the NEPA process as it relates to oil and gas development activities, reviews BLM's oil and gas-related NEPA documents, and concludes that these NEPA documents: 1) complied with the broad principles of the NEPA, 2) made adjustments to analysis content and format in an effort to improve analysis and respond to public comments, and 3) developed a logical system of addressing sequential actions in oil and gas fields. In addition, the report concludes that BLM has clearly and consistently involved the public and federal, state, and local agencies in the scoping and preparation of all the listedNEPA analyses.

Concerning cumulative impact analysis, the report describes a purposeful and steady evolution in response to public comment and agency review. Cumulative analyses have become more comprehensive and more closely tied to affected resources. However, a more consistent approach to cumulative impact analysis is needed. Emphasis should be placed on the resources affected rather than on project impacts. The report shows a need to clarify agency roles and responsibilities and to build cooperation with other agencies. Disagreements over technical analysis procedures need to be resolved.

Chapter Three also includes conclusions and recommendations related to specific issues such as transportation planning, air quality, water and visual resources, and wildlife.

Chapter Four examines programs and efforts related to oil and gas development. These include analysis of all databases for southwest Wyoming resources, monitoring and mitigation practices, landtype delineations, cultural resource evaluation, and socioeconomic analysis.

## APPENDICES A and B

Appendix A summarizes the present status of oil and gas development in relation to the reasonably foreseeable development projections contained in the four SWRE Resource Areas' RMPs and oil and gas-related EISs. The current number of wells in each of the four resource areas is below the level of development projected in the RMPs/EISs.

Appendix B is a compilation of the recommendations found throughout the report.

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[1] The SWRE area encompasses 15.6 million acres in all or parts of six southwestern Wyoming counties—Carbon, Fremont, Lincoln, Sublette, Sweetwater, and Uinta (see Map 1). The Green River, Pinedale, and Kemmerer Resource Area offices (Rock Springs District) and the Great Divide Resource Area office (Rawlins District) manage the public lands in the evaluation area.

# GUIDE TO ACRONYMS

| | |
|---|---|
| AFMSS | Automated Fluid Minerals Support System |
| ALMRS | Automated Lands and Minerals Records System |
| APD | Application for Permit to Drill |
| BLM | Bureau of Land Management |
| CAP | Coordinated Activity Plan |
| CEQ | Council on Environmental Quality |
| CFR | Code of Federal Regulations |
| CIA | Cumulative Impact Analysis |
| CITF | Cumulative Impact Task Force |
| DM | Department Manual |
| DEQ | Department of Environmental Quality |
| | AQD—Air Quality Division |
| EPA | Environmental Protection Agency |
| EA | Environmental Assessment |
| EIS | Environmental Impact Statement |
| ERRP | Erosion Control, Revegetation, and Restoration Plan |
| FLPMA | Federal Land Policy and Management Act |
| FS | United States Department of Agriculture Forest Service |
| GIS | Geographic Information System |
| GRBAC | Green River Basin Advisory Committee |
| IBLA | Interior Board of Land Appeals |
| MOSS/MAP | Map Overlay and Statistical System/Map Analysis and Processing System |
| NEPA | National Environmental Policy Act |
| NSO | No Surface Occupancy |
| P&A | Plugged and Abandoned |
| RFD | Reasonable Foreseeable Development |
| RMP | Resource Management Plan |
| ROW | Right Of Way |
| ROD | Record Of Decision |
| SIP | State Implementation Plan |
| SWRE | Southwest Wyoming Resource Evaluation |
| SWTAF | Southwest Wyoming Technical Air Forum |
| TMDL | Total Maximum Daily Load |
| USC | United States Code |
| USGS | United States Geologic Survey |
| VRM | Visual Resource Management |
| WGFD | Wyoming Game and Fish Department |
| WOGCC | Wyoming Oil and Gas Conservation Commission |
| WSA | Wilderness Study Area |

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# CHAPTER ONE

# INTRODUCTION AND BACKGROUND

In February 1995, the Wyoming Bureau of Land Management (BLM) initiated the Southwest Wyoming Resource Evaluation (SWRE),[2] a comprehensive three-phase evaluation of its land use planning decisions, impact prediction, and National Environmental Policy Act (NEPA) analyses for the southwest Wyoming area. Only BLM-administered surface lands and subsurface minerals are included in the SWRE. The latter includes all federal subsurface minerals even though the surface may be managed or owned by other state, federal, or private entities.

BLM determined a need for this evaluation in anticipation of widespread new development demand. Oil and gas industry sources' predicted that southwest Wyoming will become the major natural gas producing region in the United States by the year 2015. Rapid growth in natural gas exploration and drilling in this area began in 1991. BLM is concerned about the developments' impacts upon other public land resources and uses (e.g., grazing, wildlife, fisheries, recreation, cultural) and the adequacy of the present BLM environmental analysis/project approval process. BLM's primary objective in the SWRE is to determine if a cumulative impact assessment or regional EIS of energy and nonenergy development activities in southwest Wyoming is necessary.

## EVALUATION OBJECTIVES AND ACCOMPLISHMENTS

Phase One of the SWRE involved the gathering of existing data and the compilation of the following reports: Planning, NEPA Analysis, Landtype Delineation, Socioeconomic Analysis, Cultural Resource Data Management and Context, Issue Identification, and Existing Data Sources.

This Phase Two Report consists of the summary, review, and analysis of the Phase One information. The analysis revealed some technical and procedural gaps within BLM's various resource programs. Recommendations to correct or improve these conditions are included in this report.

Phase Three work will depend on the results of the Phase Two analysis. At the beginning of the SWRE process, the BLM envisioned three possible Phase Three conclusions:

1) Land use plan implementation and environmental impact statement predictions are satisfactory. It is acceptable to continue current practices and monitoring. The continuation of Phase Three is unnecessary.
2) Data/information is insufficient to make a decision. Collect more data or wait for more data to become available.
3) Land use plan implementation and environmental impact statement (EIS) prediction are not satisfactory. Corrective planning measures must be taken.[3]

The SWRE's eight objectives, together with information on how the objectives were met, are as follows:

1) Define and characterize the affected ecosystem in southwest Wyoming. This was accomplished by the publication of the Phase One report, "Delineations of Landtype Associations for Southwest Wyoming."
2) Identify land use plan decisions and related management prescriptions, their comparability, and determine if established threshold levels have been met or exceeded. This information is presented in Chapter Two and Appendix A of this report.
3) Determine the scope of NEPA impact prediction and if NEPA analyses are compatible. This is discussed in Chapter Three of this report.
4) Identify the location and format of government and private baseline environmental and economic data for southwest Wyoming. These databases are identified in the Phase One report, "Socioeconomic Analysis."
5) Identify data gaps and future evaluation research needs for the southwest Wyoming area from unanticipated or predicted effects. The data gaps are noted in the Phase One report, "Existing Data Sources," and recommendations for future needs are identified on page 44 of this report.
6) Identify issues and areas of concern about energy and mineral development in the area. The Phase One report, "Issue Identification," accomplished this. The issues are discussed further on pages 20 and 21 of this report.

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[2] A guide to acronyms is found at the front of this document.

[3] Corrective planning measure may take the form of resource management plan maintenance or amendments, compilation of ecosystem databases, initiation of field studies or projects, or adjustment to BLM-required practices. The preparation of a NEPA analysis (e.g., development of an ecosystemwide EA or EIS on RMP changes) may or may not be required for any of these actions.

7) Determine if mitigation measures are satisfactory and establish a consistent set of operation/design standards and practices in the area. BLM chose not to evaluate specific monitoring measures for this report because of the lack of complete monitoring data.
8) Provide a comprehensive ecosystemwide cumulative benefits and impact evaluation of energy and nonenergy mineral development. The rational, conclusions and final recommendation are discussed in Chapters Two, Three and Four of this document.

THE SWRE would also accomplish four secondary objectives. The first two objectives have been achieved by the gathering of information for and the publishing of the Phase One and Two reports. These four secondary objectives are:

1) Provide data and analysis for decisionmakers to consider when making future strategic decisions on oil and gas leasing.
2) Provide data for decisionmakers to consider for future resource allocations in a resource management plan (RMP).
3) Relate land ownership patterns to oil and gas drainage.
4) Provide a clear assessment of the economic value and importance of the SWRE area to local, state, and national economies and to energy and mineral supplies. This was done in the Phase One Socioeconomic report.

The Phase Two report addresses the following seven items:

1) Land use plan decision consistencies are identified and discussed on pages 17-18.
2) Determination of NEPA impact prediction accuracy is discussed in general throughout Chapter Three.
3) Chapter Three also addresses the consistency of NEPA analysis levels throughout southwest Wyoming.
4) Database consistencies and inconsistencies are discussed on page 33.
5) Recommendations for an areawide database format, a methodology to develop such a database is discussed on page 33.
6) Determination of prescribed mitigation measure effectiveness and identification of areawide operation and design standards are discussed on pages 33-35.
7) The rationale pertaining to a cumulative impact assessment of energy and nonenergy development activities is presented on page 36.

## EVALUATION AREA

The SWRE area encompasses 15.6 million acres in all or parts of six southwestern Wyoming counties—Carbon, Fremont, Lincoln, Sublette, Sweetwater, and Uinta (see Map 1). The Green River, Pinedale, and Kemmerer Resource Area offices (Rock Springs District) and the Great Divide Resource Area office (Rawlins District) manage the public lands in the evaluation area. The boundaries of the evaluation area are the Utah-Wyoming border and Wyoming Range on the west, the Wind River Range and extending eastward along the Green and Ferris Mountains on the north, the Continental Divide on the east, and the Colorado/Utah/Wyoming borders on the south.

The SWRE examines resources, management practices, and decisions on an ecosystem basis. However, since the focus of the evaluation is on BLM-administered public land in southwest Wyoming, the SWRE area's boundaries do not extend outside of the state of Wyoming, and this report does not examine other federal agency and/or county land use decisions.

The lands in the SWRE area fall into a complex mix of ownership of both surface and mineral estates. The federal government owns 67.6 percent (10,551,551 acres) of the surface estate in the SWRE area (see Table 1). BLM administers 77.7 percent (8,197,235 acres) of that federal surface estate. The balance of the federal surface estate (2,354,326 acres or 22.3 percent) is administered by other federal agencies such as the United States Department of Agriculture Forest Service (FS), the Bureau of Reclamation, the United States Fish and Wildlife Service (USFWS), and the National Park Service.

Typically, the surface estate owner also owns the underlying mineral estate. However, on 5.1 percent (796,785 acres) of the SWRE area, the mineral estate is owned by the federal government and administered by the BLM while the overlying surface estate is privately owned. The BLM manages all federally-owned minerals in the SWRE area, whether they are under private surface or under surface administered by another federal agency.

Approximately 95 percent of the federal mineral estate in southwest Wyoming is available for leasing consideration; approximately 53 percent of that federal mineral estate (as of April 1997) is leased for oil and gas development (see Table 2 and Map 2), and approximately 22 percent is in production.

### History of Area

The Conservation Division of the United States Geological Survey (USGS) was the first federal agency responsible for the approval and analysis of oil and gas development in the SWRE area (1897-1982). That responsibility then passed to the Minerals Management Service (MMS) (1982-1983); since 1983, the responsibility has been the BLM's. As proposed projects have increased in scale, the scope and complexity of the environmental impact analyses have also increased. Significant development and utilization of federal mineral resources in southwest Wyoming began in the early 1970s with development peaking in the early 1980s. Following this period, all minerals experienced declines in development. In 1991, exploration and drilling for natural gas began to increase. In the early to mid-1970s, only projects with exceptional health and safety features, such as sour gas processing plants, were addressed in EISs. Most single well drilling proposals were evaluated by site-specific environmental assessments (EAs). As the number of development areas increased, unitwide EAs were prepared when new fields were developed. When sensitive issues or areas were involved, EISs were required. In 1992, in response to increased drilling activity and a concern shared by environmental groups for improved cumulative impact analysis, BLM began to require EIS-level analysis for nearly all proposals, both infill and new field development.

## CUMULATIVE IMPACT ASSESSMENT

***The SWRE objective is to prepare a cumulative impact assessment of energy and nonenergy development activities, if warranted.***

Because the SWRE's primary purpose is to help BLM determine if a cumulative impact assessment is warranted, the discussion and determination of this objective occurs in chapter Four in this report. The rationale for the conclusion is in Chapters Two, Three, and Four.

BLM determined that oil and gas-related decisions in the four SWRE RMPs were uniformly consistent with only minor technical differences in the application of mitigation measures. These plans employ consistent criteria for: 1) determining leasing areas, 2) best management practices industry will follow to minimize impacts, 3) timing, surface use, and surface occupancy stipulations, and 4) projections about oil and gas development (page 17).

BLM's impact analyses have met the completeness and analytical requirement of NEPA. This is based on the following findings: Although NEPA analysis prepared 10 or 15 years ago may not meets today's standards, at the time the analyses were prepared, BLM used the best available information, sought and addressed public concerns, and met the content requirements of 40 CFR 1500. BLM has employed a logical approach to selecting the level of analyses (page21). BLM has continually and creatively worked to define and use alternatives that reflect reasonable and "real-world" situations (pages 24-25). BLM has improved the quality, content, and analytical approach of its resource analyses (page 24-32). BLM has altered its analyses when new information or public concerns were raised. An example is the treatment of air quality issues in the Expanded Moxa Arch and Fontenelle projects (pages 27-28).

Certain portions of BLM's NEPA analysis can be improved, as recommended in Appendix B. The discussion of the evolution and improvement of cumulative impact analysis in project documents on pages 25-27 is evidence that BLM has improved and will continue to improve its NEPA analyses.

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## TABLE 1

## SOUTHWEST WYOMING RESOURCE EVALUATION ACREAGE CALCULATION BY COUNTY[1]

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| County | Total Acres Land Surface[2] | Acres Federal Surface+ Minerals[3] | Acres State, County, City, etc. Surface | Acres Private Surface | Acres BLM Surface | Acres Federal Mineral-Private Surface |
| Lincoln | 2,649,303 | 1,929,347 | 123,203 | 596,753 | 1,015,966 | 115,778 |
| Uinta | 1,375,425 | 575,552 | 53,376 | 746,497 | 538,775 | 100,704 |
| Sublette | 3,227,963 | 2,432,437 | 243,334 | 552,192 | 1,258,669 | 386,248 |
| Sweetwater | 6,720,293 | 4,584,455 | 307,197 | 1,828,641 | 4,514,065 | 76,295 |
| Carbon | 1,573,760 | 981,760 | 95,360 | 496,640 | 821,760 | 116,480 |
| Fremont | 52,480 | 48,000 | 3,200 | 1,280 | 48,000 | 1,280 |
| **TOTAL** | **15,599,224** | **10,551,551** | **825,670** | **4,222,003** | **8,197,235** | **796,785** |
| % of TOTAL | 100.0 | 67.6 | 5.3 | 27.1 | 52.5 | 5.1 |

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[1] All acres are estimates based upon County Assessors Office and BLM records.

[2] Total acres of land in the county located within the area of the Southwest Wyoming Resource Evaluation. All of Lincoln, Uinta, Sublette, and Sweetwater Counties are included. Only parts of Carbon and Fremont Counties are affected. Column 3 + column 4 + column 5 = column 2.

[3] These acres of federal land surface are "entitlement" acres. This includes land managed by the BLM, the USDA Forest Service, the National Park Service, the U.S. Fish and Wildlife Service, and the U.S. Military. In 1976, Congress passed the Payment in Lieu of Taxes Act (PILT) to provide federal money to local county governments whose jurisdictions contained large areas of land in federal ownership exempt from property taxes. These funds may be used by the counties as they see fit. BLM was selected by Congress in the Act to manage the PILT program and has made payments to local governments containing qualified federal land since 1976.

[May 1995]

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## TABLE 2

## FEDERAL MINERAL ESTATE LEASED ACREAGE

| County | Total acres[1] leased as of 1992 | Total acres[1] leased as of 1995 | Total acres[1] leased as of 4/1/96 | Total acres[1] leased as of 4/28/97 | Percent of federal[2] surface & mineral estate leased 4/28/97 |
|---|---|---|---|---|---|
| Lincoln | 480,899 | 679,641 | 616,834 | 455,880 | 24% |
| Uinta | 273,867 | 435,214 | 431,051 | 359,418 | 62% |
| Sublette | 695,621 | 1,212,083 | 1,216,532 | 1,109,506 | 46% |
| Sweetwater | 1,988,850 | 3,293,401 | 3,276,983 | 2,838,845 | 62% |
| Carbon | 647,210 | 963,997 | 931,951 | 811,066 | 83% |
| **Total** | **4,086,447** | **6,584,336** | **6,473,351** | **5,574,715** | |
| Percent | 38% | 63% | 62% | 53% | 53%[3] |

[1,2] Total leased acreage includes acreage leased within the Bridge-Teton and Wasatch National Forests, Bureau of Reclamation, and Seedskadee National Wildlife Refuge (U.S. Fish and Wildlife Service).

[3] This percentage does not include the SWRE acreage in Fremont County.

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# CHAPTER TWO

# LAND USE PLANS

***The SWRE objective for land use plans is to review the land use plans for consistency among plans and identify the extent of inconsistency.***

## LAND USE PLAN EVOLUTION

Bureau of Land Management land use planning has evolved over the years from plans dealing with few controversial issues (1960s-1970s) to more recent plans (1985-1997) which are much broader in scope, more complex, and deal with more issues. BLM's initial land use plans were prepared under the management framework plan (MFP) process which allocated resource uses based upon conflict resolution and did not include an analysis component. This process was in place from the mid-1960s through the early 1980s. The BLM issued its current planning regulations, which began the RMP process, in May 1983. This RMP process integrated compliance with NEPA and provided increased opportunity for public involvement/participation in the planning process. Supplemental Program Guidance for Energy and Mineral Resources was issued in November of 1986. This provided guidance for the analysis of potential fluid mineral occurrence, cumulative impacts of reasonably foreseeable development, and necessary constraints. In May of 1990 BLM issued a Handbook on Planning for Fluid Mineral Resources (H-1624-1) which provided guidance on:

- Compliance with the resource management planning requirements for fluid minerals and assistance in preparing RMP amendments.
- EAs tiered to existing environmental documents.
- Supplemental EISs involving fluid minerals.
- Fluid minerals EAs or EISs prepared for an area in which there is no land use plan.
- Plans or environmental documents of another surface management agency involving fluid minerals where the BLM is a cooperating agency.

## SUMMARY OF PHASE ONE REPORT

### Planning Levels

Federal law directs that the bulk of federal lands—the national forests and BLM lands—be managed for multiple use and sustained yield. Under this multiple-use doctrine, BLM has broad discretion to determine the appropriate balance of resource uses and protection.

Since 1976, the Federal Land Policy and Management Act (FLPMA) has required BLM to make multiple-use management decisions pursuant to interdisciplinary land use plans. The Act directs BLM to consider public input and nine principles found in Section 202(c) of FLPMA when preparing the land use plans. These plans generally define the broad discretion the BLM possesses under its multiple-use mandate by providing various management guidelines with which future resource management decisions must comply.

The Federal Land Policy and Management Act and BLM's planning regulations provide only very general guidance for the content of BLM RMPs. The Act itself provides little guidance as to the content of RMPs other than to direct that the BLM "use and observe the principles of multiple use and sustained yield" and to require that RMPs "provide for compliance with applicable pollution control laws" (43 USC. 1712 [c][1]&[8]). Bureau planning regulations also contain few substantive directives. These regulations state, in part, that RMPs should generally establish: 1) land areas that will have limited, restricted or exclusive use; 2) resource uses that will be allowed and levels of production or use that will be maintained; and 3) resource condition goals and objectives to be attained (43 CFR 1601.0-5[k]).

With respect to oil and gas development activities, RMPs may determine which public lands will be open to leasing, what types of surface restrictions may or will be attached to the federal lease, and what mitigation measures may or will be required.

BLM planning activities can be divided into three levels:

- The **policy and guidance level** identifies goals, objectives, priorities, alternatives, and other factors for use in planning. National policy, laws, federal regulations, state director guidance, executive orders, and other presidential, secretarial, and director-approved directives are part of this level.
- The **resource management plan (RMP) level** establishes the combinations of public land and resource uses; the related levels of resource management or protection; the allocation of resources and selection of appropriate uses for the public land; the systems to monitor and evaluate the status of resources; the means for determining the effectiveness of management practices; and the general management practices and constraints for the various public land resources covered by the plan.

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- The **activity or implementation plan level** deals with site-specific and detailed planning in smaller geographic areas (within the RMP planning area) and on-the-ground implementation of RMP decisions. While activity plans can be program or project-specific, coordinated (interdisciplinary) activity plans are preferred. Activity plans are short-term plans that identify how the bureau intends to accomplish RMP objectives on specific sites.

Specific to oil and gas, the policy and guidance level is exemplified by the Mineral Leasing Act of 1920 and amendments which mandate the maximum recovery (conservation) of federal oil and gas resources for economic benefit and national security. The RMP level determines where and under what conditions exploration, development, and utilization activities can be allowed. These determinations are made in accordance with policies and procedures set forth in BLM's planning regulations and manual guidance *Planning For Fluid Minerals Resources Handbook*, (H-1624-1). They are the basis for timing, controlled surface use, and no surface occupancy stipulations that are attached to federal oil and gas leases. The RMP also identifies the circumstances necessary for granting a waiver, exception, or modification to any stipulation. The activity plan level is exemplified by the processing of applications for permit to drill (APDs) and rights of way (ROWs) and the preparation of their associated environmental analysis.

Compliance with NEPA has been integrated into BLM's resource management planning process. The BLM has a statutory responsibility under NEPA to analyze and document the direct, indirect and cumulative impacts of past, present and reasonably foreseeable future actions resulting from federally authorized fluid minerals activities. Since November 1986, the EIS prepared for the RMP is intended to satisfy NEPA requirements for issuing fluid mineral leases. Bureau guidelines for complying with NEPA requirements are set forth in the BLM *NEPA Handbook* (H-1790-1).

## Planning Criteria for the Resource Management Plan Level

Planning criteria identify the sideboards and constraints of issues addressed in the planning analysis. The criteria guide and direct collection of data and development of the RMP. The criteria also define the scope of the analysis for the RMP NEPA analysis. Representative criteria include identification of mineral potential areas, adoption of practices (or mitigation measures) for surface disturbing activities, and compliance with environmental laws.

National policy regarding use and development of federal oil and gas resources is presented in the Mineral Leasing Act of 1920 and its amendments. The policy encourages development of federal oil and gas resources for national security and promotion of national, state, and local economies. The policy also requires that federal agencies ensure oil and gas resources are not wasted and that the federal government receives full value for the recovery of these resources.

The BLM is charged with the development and conservation of oil and gas resources in a multiple-use context prescribed by both the Mineral Leasing Act and FLPMA. Oil and gas development on intermingled public and private lands further complicate this issue. Production on adjacent private lands may drain federal reserves. In these circumstances, BLM is required to consider the drilling of protective wells to prevent the loss of federal oil and gas and its revenue.

Oil and gas planning criteria require BLM to identify public lands with mineral potential and apply appropriate mitigation measures. Lands are generally considered "open and available" unless resource conflicts prevent or restrict leasing. In a few circumstances, this means no leasing, as in the case of wilderness study areas. Most federal lands are leased with protective stipulations. Subsequent NEPA analyses for oil and gas development proposals may result in refining mitigation requirements.

In addition to identifying development potential areas, BLM planners made assumptions about the proportion of leases that would be explored, the proportion of explored leases that would be productive, and the density of wells necessary to adequately extract the oil and gas resource. It was generally assumed only a small proportion (less than 25 percent) of leases held would be explored and only a small proportion (less than 25 percent) of leases explored would become productive. For example, roughly 67 percent of the total land area in the SWRE area is federal minerals. Approximately 95 percent of the federal minerals are available or open to oil and gas leasing; 53 percent are actually leased; and 22 percent of the leased lands are in production. Only 10 percent of all federal mineral lands in the SWRE area are in oil and gas production. Furthermore, the total area of leased lands has decreased from approximately 9,200,000 acres in 1982 to 5,575,000 in 1997, a decline of approximately 40 percent (See Table 2).

## Land Use and Resource Elements in RMPs

Resource management plans have been prepared for each resource area. Within the SWRE area there are four RMPs. They are the Great Divide RMP in the Rawlins District (completed in 1990), and the Green River (1997), Kemmerer (1986), and Pinedale (1988) RMPs in the Rock Springs District (see Map 1).

The Phase One Report identified eighteen land use and resource elements considered in the four southwest Wyoming RMPs. These planning elements are:

Air Quality
Cultural Resources
Fire Management
Forest Management
Hazardous Materials
Lands and Realty Management
Grazing Management
Minerals Management
Off-Road Vehicle Management
Recreation Management
Special Status Plants and Animals
Special Area Designations
Visual Resource Management
Watershed/Soils Management
Wild Horse Management
Wilderness Management
Wildlife Habitat Management
Wild and Scenic River Management

For each of the planning elements, general planning decisions and practices, including those for the oil and gas program, were presented. Examples include:

- Controlled surface use limiting the placement or location of facilities (e.g., set-back restrictions from cultural or historic trails and sites, riparian areas, and surface waters).
- Seasonal (timing) restrictions to protect sensitive resources during certain times of the year (e.g., crucial winter ranges, nesting and breeding areas, saturated soil periods).
- No surface occupancy (NSO) restrictions to provide the maximum protection of resources (e.g., steep slopes, developed recreation areas, some special management areas).

## RESOURCE OCCURRENCE, DATA AVAILABILITY, AND PUBLIC INPUT IN RMPS

Each RMP addresses the resources present within the land area covered by the RMP. The amount of detail and management prescriptions identified in the RMP reflect the knowledge and amount of public interest in the resources at the time the document was prepared. As a result, the same resource may be treated somewhat differently in the various documents.

Examples of RMP differences due to the presence/absence of resources include:

- None of the four RMPs address air quality in great detail because at the time of their preparation (all initiated prior to 1995), potential violation of National Ambient Air Quality and Visibility Standards in southwest Wyoming had not been identified.
- The Pinedale RMP identifies two transportation corridors as preferred routes, while the other RMPs do not designate corridors. Right-of-way corridors were not designated in the other RMPs due to the predominate checkerboard of private land in the planning areas.
- The coal screening process was not conducted and coal planning decisions were not made in the Pinedale RMP (as it was in the other three RMPs) because no federal coal reserves with development potential were identified in the Pinedale Resource Area.
- Wild and scenic rivers are not addressed in the Great Divide and Kemmerer RMPs, while seven segments of the Sweetwater River are considered in the Green River RMP, and 19 miles of the Green River are addressed in the Pinedale RMP.
- The Pinedale RMP has an NSO restriction on and near elk feedgrounds. These sites are not present in the other resources areas.

Examples of differences due to data availability and quality include:

- The amount of information presented in the Draft EIS for an RMP has risen consistently from 316 pages in the Draft EIS for the Kemmerer Draft RMP to 892 pages in the Green River RMP. This reflects both an increase in information from the use of automated data systems and an increase in concern and controversy about public land decisions as resource allocations more often come into conflict.
- The size of the RMP area may also determine the amount of data available. For example, the Green River Resource Area covers over five million acres while the Kemmerer and Pinedale Resources Areas cover 1.6 and 0.9 million acres, respectively.
- The ability to provide, or the demand to supply, more detailed information to support the RMPs is demonstrated by an increase in appendices size from 97 pages in the Kemmerer EIS to 259 pages in the Green River EIS.
- The Green River RMP employs Geographic Information Systems (GIS) technology. Automated mapping data allows multi-level, analytical examination of resource conflicts in a timely, cost-effective manner. This technology was not available for the prior three RMP efforts.

Public interest about public land resources during RMP preparation is also reflected in the RMPs. The Kemmerer RMP was prepared between 1983-1986. This was a time of declining oil and gas drilling activity in Wyoming which followed the boom period of the latter 1970s. Population numbers and their secondary effects and pressures also declined sharply. The Kemmerer RMP addresses issues in a direct and uncomplicated manner. The public accepted many management objectives and practices without asking for extensive supporting data. In contrast, the Green River RMP was prepared during a period (1992-1997) of sharply increasing mineral development activity, especially oil and gas. Public comments during the preparation period indicate an unwillingness to accept BLM assumptions about development benefits or impacts without documentation. The Kemmerer RMP is brief; items or data are easy to locate although the information provided is not broad. The Green River RMP, in contrast, is lengthy, filled with tables and data, and comprehensively examines issues.

Finally, land ownership patterns and the amount of public land within the planning area influence the RMP analyses. The Pinedale and Kemmerer Resource Areas, at 0.9 and 1.6 million acres of public land surface, respectively, are the smallest of the four areas. The Kemmerer Resource Area has large areas in checkerboard land ownership pattern, while the Pinedale Resource Area has large blocks of public land. Consequently, the Pinedale RMP addresses more BLM-initiated management actions than the Kemmerer RMP because lack of blocked ownership in the Kemmerer Resource Area requires BLM to seek agreement from diverse parties before initiating actions. The Green River Resource Area also contains large areas of checkerboard land ownership. However, this RMP addresses partnerships, collaborative management actions, and cooperative agreements because the BLM has stressed these management techniques over the last five years. The Great Divide Resource Area contains large areas of checkerboard ownership, blocks of public land, and areas where only scattered public land tracts exist. Hence, this RMP considers all aforementioned management perspectives.

### *Conclusion*

Considering the complexity, time span, changing issues and staff, the four RMPs examined for the SWRE are remarkably consistent. Resource decisions were made using comparable assumptions, analysis techniques, and objectives. These plans are in conformance with current BLM planning regulations and guidance. They are adequate to allow BLM to manage public land resources in a multiple-use, sustained-yield manner.

None of the RMPs address air quality in sufficient detail relative to the present level of concern. Although identified in preliminary scoping and addressed in NEPA documents up through 1994, this issue did not come to the forefront until comment on the Draft Moxa Arch and Fontenelle EISs (April 1995). Current issues needing resolution include: 1) agency role and scope of authority under the Clean Air Act, 2) determination of appropriate air quality modeling methodology, 3) interpretation of modeling results and impacts, and 4) collection of baseline meteorological and emissions data.

### *Recommendations*

1. BLM, in cooperation with the FS, Wyoming Department of Environmental Quality (DEQ), and the Environmental Protection Agency (EPA), should adopt the Southwest Wyoming Technical Air Forum's (SWTAF) recommendations and issue an air quality analysis policy to: 1) define the BLM's authority, need, and ability to measure, monitor, or use other agency air quality data; 2) ensure that emission rates from oil and gas facilities used in modeling are accurate; 3) ensure that BLM has the expertise to adequately address the science of air quality; 4) work with other agencies to agree upon regional emission standards/thresholds, and limits; 5) comply with Wyoming DEQ-AQD prescribed "best available control technology" to limit emissions from facilities on public land; 6) determine if emission standards are currently being exceeded; and 7) seek improved practices if warranted.

   BLM should continue to support the Wyoming governor's recognition of the air quality issues in southwest Wyoming. BLM should continue to participate in SWTAF to reach agreement on the parameters affecting air quality in southwest Wyoming, and to coordinate information and policy considerations. BLM should continue to participate in the development and revisions of the Air Quality State Implementation Plan (SIP).

2. BLM should clarify Mineral Leasing Act (prevention of drainage and conservation of mineral resources) and NEPA/FLPMA (protection and multiple use of natural resources) requirements to employees and interested parties.

## CONSISTENCIES/ INCONSISTENCIES

Many factors, such as timing, staffing, changes in policy, popularity of issues, and the amount of information, can work to diverge RMP preparation and formats. It is logical to expect that such divergences will occur in RMPs prepared over a 17-year period.

## Consistencies

- All four RMPs considered the 18 planning elements (page 13) with the single exception of the wild and scenic river element in the Kemmerer and Great Divide Resource Areas.
- Each RMP identified standard operating procedures for surface-disturbing activities. These standards were used to estimate direct impacts from these activities. The standards represent "best management practices" or "state-of-the-art" techniques. The standards are applied as needed to fit the site-specific situation. These standards are located in Appendix A of the Kemmerer and Pinedale RMPs, Appendix I of the Great Divide RMP, and Appendices 2, 5, and 7 of the Green River RMP.
- Consistent with the Mining Law of 1872, each RMP allows for mineral location, except on withdrawn lands.
- Each RMP provided projections for oil and gas development through at least the year 2005.
- Each RMP identifies where and under what conditions oil and gas exploration, development, and utilization activities may be allowed.
- Each RMP identifies the basis for the timing, surface use, and surface occupancy stipulations that are attached to a federal oil and gas lease.
- Each RMP identifies acceptable levels of timber harvest on public land.
- Each RMP classifies grazing allotments into three selective management categories and identifies operating procedures for grazing administration.
- Each RMP identifies access needs and isolated tracts of public land suitable for disposal through sale or exchange.
- Each RMP classifies lands into four visual resource management (VRM) classes. Management prescriptions for each class are the same in the RMPs.
- Inventories and levels of protection for cultural and paleontological resources are specified in each RMP.
- Drilling practices which protect aquifers are specified in each RMP.
- Each RMP regulates the use of herbicides and other chemical agents on public land.
- Each RMP designates wild horse herd areas and sets population objectives.

Consistent surface protection practices are employed in all four RMP areas. These decisions directly affect oil and gas development activities.

- A 1/4-mile or visual horizon (whichever is closest) buffer area along significant segments of historic trails.
- No surface occupancy on designated recreation areas.
- No surface disturbance within 500' of surface water or riparian areas.
- No construction activities when soil is frozen or saturated.
- No surface disturbance between November 15 and April 30 in big game crucial winter ranges during crucial winter periods.
- No surface disturbance between May 1 and June 30 in big game parturition areas.
- No surface disturbance between February 1 and July 31 around raptor nests.
- All four RMPs prescribe compliance with the Endangered Species Act.

## Inconsistencies

The following inconsistencies were identified in the Phase One review:

- The Kemmerer RMP was prepared prior to the publication of BLM's November 1986 Supplemental Program Guidance for Energy and Mineral Resources (BLM Manual 1624) and the May 1990 Planning for Fluid Minerals Resources Handbook (H-1624-1) and thus did not analyze the cumulative adverse effects of reasonably foreseeable oil and gas development or provide tabulations of acres affected by leasing restrictions.
- Only the Pinedale RMP identifies utility corridors. The other RMPs have loosely-worded decisions on ROW placement preference.
- The RMPs vary widely on acreage closed to oil and gas leasing. The Green River RMP identifies 386,630 acres closed to leasing, the Pinedale RMP identifies 7,636 acres closed to leasing, and no areas are classified closed to leasing in the Great Divide or Kemmerer RMPs.[4]
- The Kemmerer RMP has seasonal restrictions on geophysical operations in domestic sheep lambing areas and hunting areas; the other RMPs do not.

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[4] WSAs are not considered here because leasing is closed until Congress makes final wilderness designations.

- Camping day limits are set at 16 in the Pinedale RMP and 14 in the Green River RMP. Limits are not specified in the other two RMPs.
- VRM classifications in the Adobe Town area, addressed in both the Great Divide and Green River RMPs, are not consistent.
- All RMPs, except the Pinedale RMP, prohibit or avoid surface disturbance on unstable or erodible soils. The Pinedale RMP provides general guidelines for soil conservation.
- The Green River RMP allows stream crossing only after spring runoff is completed. The other RMPs are silent on this issue.
- The Green River, Pinedale, and Kemmerer RMPs specify a two-mile seasonal construction restriction radius around sage grouse leks to provide strutting and nesting protection. The Great Divide RMP does not specify a distance although Map #8 in the Great Divide Record of Decision (ROD) implies a two-mile radius.
- Raptor nests are protected by a 0.5-mile radius buffer in the Green River and Pinedale RMPs and a 0.75-mile radius buffer in the Kemmerer RMP. The Great Divide RMP does not specify a buffer radius.
- The Great Divide and Kemmerer RMPs specifically address buffer radii for bald eagles and falcon nests, setting the protective period between November 15-April 30 and February 1-August 15, respectively. Green River and Pinedale do not treat these species individually.
- The Kemmerer RMP has a NSO for bald eagle roosting sites and a one-mile seasonal radius no surface occupancy buffer from November 1 to April 1. The other RMPs have a no surface disturbance stipulation for raptor and game bird winter concentration areas from November 15 to April 30.

### Conclusion

In spite of large time variances, staffing and funding differences, inconsistencies among the RMPs are mostly of a minor or technical nature. These inconsistencies can be corrected by plan maintenance actions.

The most prevalent inconsistencies are minor technical and wording miscues such as data differences, lack of clarity about raptor species protection periods, and specificity about surface protection practices.

Although not inconsistent among the RMPS, but rather a matter of internal inconsistency, is the situation of oil and gas drilling staying within the reasonable foreseeable development scenarios employed in the NEPA analysis for the RMP. The present status of oil and gas activity relative to assumptions is discussed in detail in Appendix A.

### Recommendations

1. BLM field office staffs should review the inconsistencies listed above (and any others that may be subsequently identified) and conduct plan maintenance actions, if determined appropriate. This is consistent with BLM policy to maintain rather than revise plans.
2. BLM should complete an analysis of the Kemmerer RMP to determine the need for plan maintenance and/or amendment under the application of the Supplemental Program Guidance for Energy and Mineral Resources and the Planning for Fluid Minerals Resources Handbook.
3. BLM should evaluate the Pinedale RMP to determine whether there have been any unacceptable environmental effects during plan implementation (43 CFR 1610.4-9). The evaluations should focus on multiple use decisions including resource allocations and planned mitigation measures (BLM Manual 1616.9).
4. BLM should review the designation of utility corridors and ROW placement guidelines in RMPs. A final recommendation should be made and consistently applied regarding the need to designate corridors.
5. BLM should establish consistent buffer zones and restriction dates for raptor nests (by species if appropriate), winter roosting areas, and sage and sharp-tailed grouse leks. These changes to RMPs should be maintenance actions.

# CHAPTER THREE

# NEPA ANALYSIS

***The SWRE objective for NEPA documents is to review NEPA documents to determine if impact predictions made in the EISs/EAs of developments were accurate and if the level of NEPA analysis was consistent throughout the ecosystem.***

During Phase One data collection, the SWRE team determined that evaluation of NEPA document impact prediction was beyond the scope of this study because such evaluation would require extensive field measurement related to specific mitigation actions. The team decided to focus its effort on the identification of NEPA document content and format issues which were in dispute and on the identification of studies or actions for Phase Three that would resolve the disputes.

## SUMMARY OF PHASE ONE REPORT

The Phase One Report discussed the relationship of NEPA documents to land use planning in the BLM decision-making process. Development of standard stipulations for surface-disturbing activities was presented as an example of this relationship. The tiered approach to NEPA analysis for oil and gas approval was presented (RMPs, exploratory drilling EAs, full field development EAs/EISs, and field-level NEPA analysis for individual APDs). The report discussed the concept and rationale used to evaluate the 31 NEPA documents and described the method of collecting data. Finally, a table presented basic statistics about oil and gas-related NEPA documents prepared by BLM since 1984 for southwest Wyoming. The table included information on:

- Number of documents and location by county and resource area.
- Acreage covered for each analysis.
- Levels of existing disturbance at the beginning of the analysis period.
- Level of disturbance analyzed in the document.
- Amount of reclamation expected.

## OIL & GAS-RELATED NEPA ANALYSIS IN SOUTHWEST WYOMING

### NEPA Analysis for Oil and Gas Field Development

As explained in the previous chapter, oil and gas development is guided by a three-level planning process. The third level consists of oil and gas field development plans and their associated NEPA analyses. These NEPA analyses may involve three tiers of analysis: 1) the exploratory tier, 2) the full field development tier, and 3) the individual site APD tier. The analysis can be either an EA or EIS (selection of analysis type is discussed below) and examines impacts to a defined area within a BLM planning unit. The NEPA analyses can prescribe modification of existing mitigation measures or implementation of new measures. If practicable and reasonable, additional or missing data may be collected for the field-level analysis that was not available for the RMP analysis.

When BLM assumed responsibility for administering oil and gas activities on federal lands, there was already a significant amount of oil and gas infrastructure in southwest Wyoming. Some fields, such as the Overthrust, Moxa Arch, Fontenelle (Lincoln Road Unit, Fontenelle II Unit), Big Piney-LaBarge Platform, Nitchie Gulch, Patrick Draw, Soda Unit, and Wamsutter Arch, were already developed while other areas, such as Stagecoach Draw, Jonah Prospect, Mulligan Draw, and the Red Desert, were lightly explored. Upon this pattern of existing and prospective development, BLM applied an analysis system in accordance with its planning regulations and NEPA.

BLM employed two streams of NEPA analysis for oil and gas development. For new or exploratory areas, BLM required preparation of site-specific EAs for the first individual APDs. The exploratory phase usually involved drilling a wildcat well followed by several confirmation/delineation wells. Once the reservoir was delineated, the oil company was able to make projections on drilling pace

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and well-spacing. These projections were used to develop alternatives for a field-level NEPA analysis. The Mulligan Draw, Soda Unit, and Dripping Rock analyses are examples of this stream. These analyses were typically at the EA-level. If the wildcat well was a dry hole and abandoned, or produced poorly and no further development was proposed, a field-level analysis was not prepared.

The second stream involved oil and gas actions in developed fields. These proposals were addressed in site-specific analyses if there was no concentrated drilling effort or if BLM was unable to identify drilling trends. This resulted in a few wells drilled by one or various operators, aggregating to tens of wells per year in a specific area. BLM urged operators to make projections and submit multi-year drilling proposals. If these were received, BLM selected an analysis level (EA or EIS) after scoping.

In the late 1980s, as geophysical data became more precise and drilling more extensive, knowledge about the location and extent of producing formations became clearer to operators. This resulted in companies being able to submit multi-year plans for analysis and approval. Drilling projections evolved from a one-year program of up to ten wells to ten-year programs of several hundred wells. Concurrently, the size of the project area increased from thousands of acres to hundreds of thousands of acres. On the face of it, initial impacts appeared to be greatly increased in the latter proposals. However, when considered on an annual basis, the drilling rate has not greatly increased, although cumulative impacts continue.

In the early 1990s, drilling technology advanced tremendously and became much more sophisticated. For example, a 7,000 to 8,000 foot conventional straight hole well is now being drilled in one to two weeks where it once took one to two months; a 10,000 to 12,000 foot conventional straight hole well is being drilled in two to three weeks where it once took two to three months. This has reduced the site specific short-term impact upon sensitive resources (e.g., wildlife) from a one-to-three month period to a one-to-three week period due to shorter periods of drilling activity and earlier completion of reclamation efforts.

## Scoping and Issues

During the NEPA process, each project listed in Table 3 was first examined for issues and alternatives by BLM interdisciplinary teams. Public input was then obtained through scoping comments and/or public scoping meetings. All of the environmental analyses addressed the following issues:

- Air quality
- Cultural and paleontological resources
- Cumulative impacts
- Erosion control practices
- Improving industry practices
- Land use plan and NEPA conformance
- Livestock grazing
- Reclamation and noxious weed control
- Socioeconomic
- Transportation Planning
- Visual resources
- Water-related resources (e.g., wetlands, surface and ground water quality)
- Wilderness and wilderness study areas
- Wildlife and wild horses

Until 1993, public response to scoping notices for oil and gas development proposals (e.g., Moxa Arch EA, Fontenelle II EA, Soda Unit EA) was minimal. Typically, comments were only received from other federal, state, and local government agencies. Since 1994, public involvement has increased. This is attributable to increased interest in development activities in southwest Wyoming.

Comments on scoping and the NEPA documents themselves fall into one of three broad groups. First, BLM was requested to provide specific information in the analyses. Examples include soil type delineation; topographic and geologic features that should be avoided by oil and gas activities; amount of direct loss of forage or wildlife habitat from construction activities; identification of beneficial or adverse socioeconomic effects from oil and gas development; amount and pace of reclamation; and more complete information on traffic level, vehicle mix, and expected road density in developing oil fields.

Second, BLM was challenged on the adequacy of its analysis and decisionmaking processes and asked to explain how it complied with various laws and regulations. For example, commentors asked what criteria were used to require a Class III cultural or paleontological survey, what were specific reclamation objectives and how did BLM ensure compliance, how were erosion control measures determined, and how did BLM determine significance levels for the analysis?

Third, BLM was criticized for making decisions with incomplete or inadequate information. BLM was charged with incomplete air quality analysis, using improper modeling methods, and failing to consult with other responsible agencies. The method, scope and quantification of cumulative impacts were criticized. The inability to determine sedimentation levels in the Green River Basin was noted. Conformance with reasonable foreseeable development scenarios in the RMPs was questioned. Both the lack of transportation planning for projects and a lack of understanding about indirect impacts to wildlife populations were noted. Finally, BLM's use of existing data, decisions to collect or not collect additional information, use of databases outside BLM, and decisionmaking with inadequate levels of data were a point of objection.

## Level of NEPA Analysis

The BLM decides whether to prepare an EA or EIS based in part on the comments and issues identified during scoping and in part on regulatory guidance. If the issues are substantial and the degree of impact meets the Council on Environmental Quality (CEQ) definition of "significant," then BLM is required to prepare an environmental impact statement on the proposed action (40 CFR 1502.1, 1508.27). Environmental assessments are prepared to "provide sufficient evidence and analysis for determining whether to prepare an EIS or a finding of no significant impact" (40 CFR 1508.9(a)(1)).

Department of Interior policy states, "An EA will be prepared for all actions, except those covered by a categorical exclusion, covered sufficiently by an earlier environmental document, or for those actions for which a decision has already been made to prepare an EIS" (516 DM 3.2.A.). BLM policy states, "An EA must be prepared for proposed actions that (1) are not exempt from NEPA, (2) have not been categorically excluded, (3) have not been covered in an existing RMP/EIS or other environmental analysis, and (4) **do not normally or obviously require an EIS** [emphasis added] (*BLM Handbook* H-1790-1, IV.A.).

In theory, NEPA envisions preparation of short, concise EAs that would quickly let decisionmakers know if an EIS was required. In practice, after agencies gained experience with typical actions, deciding whether to prepare an EA or EIS became second nature.

## TABLE 3
## SOUTHWEST WYOMING OIL & GAS EISs/EAs PREPARED 1983-1997

| EIS LEVEL ANALYSIS | | | EA LEVEL ANALYSIS | | |
|---|---|---|---|---|---|
| Document | Wells | Date[1] | Document | Wells | Date[1] |
| Riley Ridge | 238 | 1/84 | | | |
| | | | Dripping Rock Unit/Cedar Break Area | 58 | 4/85 |
| Hickey/Table Mountain | 56 | 6/87 | | | |
| | | | Sierra Madre Oil & Gas Unit | 46 | 9/87 |
| | | | Soda Unit | 17 | 6/88 |
| | | | Fontenelle II In-fill | 45 | 7/91 |
| | | | Big Piney/LaBarge CAP | 600 | 8/91 |
| | | | Hay Reservoir Unit | 20 | 6/92 |
| | | | East LaBarge Infill | 37 | 7/92 |
| | | | Greater Wamsutter Area | 70 | 8/92 |
| | | | Fontenelle II (Texaco/ Wash. Energy) Infill | 30 | 9/92 |
| Mulligan Draw | 45 | 9/92 | Fontenelle II (Wash. Energy) Infill | 26 | 12/92 |
| | | | Bird Canyon | 10 | 8/93 |
| | | | Mobil Project | 167 | 6/94 |
| Burley Field | 33 | 6/94 | Jonah Field | 40 | 8/94 |
| Creston/Blue Gap | 275[2] | 10/94 | | | |
| | | | Essex Mountain | 3 | 8/95 |
| | | | Bravo Unit | 3 | 8/95 |
| Stagecoach Draw | 144 | 6/95 | | | |
| Greater Wamsutter Area II | 750[3] | 11/95 | | | |
| Moxa Arch Expanded | 1325 | 3/97 | | | |
| Fontenelle Infill | 1317 | 3/97 | | | |
| Continental Divide/Wamsutter II | 3000 | IP | | | |
| South Baggs Area | 50 | IP | | | |
| Jonah II | 450 | IP | | | |
| **Average Wells/Analysis = 582**<br>[1]Decision document date. IP=In progress.<br>[2]on 250 locations [3]on 300 locations | | | **Average Wells/Analysis = 78**<br>**Average Wells w/o CAP area = 38** | | |

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Table 3 shows that between 1983 and 1992, the predominant type of NEPA level analysis was an EA analyzing a 40-50 well proposal. The one exception was the Big Piney/LaBarge Coordinated Activity Plan which was prepared as an EA analyzing 600 wells and was tiered to the RMP. The EISs prepared during this period cannot be categorized because of the individual projects' unique circumstances. The Hickey and Table Mountain EIS (56 wells) project area was partially located within the Wasatch National Forest. The Mulligan Draw EIS (46 wells) project area was located adjacent to Adobe Town Wilderness Study Area. The Riley Ridge EIS (238 wells) had sour gas and large processing plants and was located in mountainous terrain.

After 1992, due both to increased public requests for EIS-level analysis and to increased drilling activity (five EAs and one EIS were completed in 1992 alone, more than in any other single year), BLM required EIS-level analysis for actions that had previously been analyzed at the EA level. The Burley Field (near Big Piney) and South Baggs Unit (near Baggs) are examples. The primary rationale behind this change was the recognition that cumulative impacts might be approaching significant levels, the increased controversy around oil and gas activity, and the increase in appeals of BLM oil and gas decisions.

BLM generally utilized a combination of numerical criteria (the number of wells and whether the wells were exploratory or developmental), sensitivity of resource values within the proposed exploration or development area, and public concern/controversy to determine the potential for significant impact and to ultimately decide if an EA or EIS level analysis should be prepared. The determination included consideration for both increasing or decreasing the level of analysis depending on what the criteria showed. First-time impacts or unusual risks pushed the analysis to the next level while tiering to an existing EIS or RMP moved a large proposal to the next lower level.

Further clarification of NEPA analysis level came as a result of the Michael Gold Case (On Reconsideration) 115 IBLA 218 (1990). The determination as to when an EIS is required as drilling proceeds from exploration to full development depends upon the facts particular to each situation (Washington Office IM-91-348). An EIS will be necessary at some point in the development process, and this should be factored into decisions about future NEPA compliance as oil and gas wells proceed from leasing to full development. The circumstance to be identified is the point at which activities significantly affect the quality of the human environment and thereby require an EIS.

The Wyoming BLM state director, through Instruction Memorandum No. WY-91-413 (August 28, 1991), provided direction on when to prepare an EA or an EIS:

Managers will be responsible for determining whether an EIS is required by looking at each situation and its particular situation. New development, old development, development in environmentally sensitive areas plus wildlife effects from drilling, the Endangered Species Act compliance, available alternatives, the cumulative impact of the proposed and anticipated development and whether significant adverse impacts are found are critically important in determining whether an EA or an EIS needs to be completed under the CEQ regulations to implement NEPA.

This includes APDs for development wells in existing active fields.

Some of the issues involved may be handled in the preparation of RMPs, EISs, or plan amendments that fully incorporate oil and gas program procedures such as Reasonable Foreseeable Development. The issues may also be addressed in the stand-alone EAs or EISs for oil and gas field development.

All of the five NEPA analyses on oil and gas activity in southwest Wyoming currently in preparation or recently completed are at the EIS level. These five NEPA analyses are Continental Divide/Wamsutter II, Jonah II, Fontenelle Natural Gas Infill Drilling Project, Expanded Moxa Arch Area Natural Gas Development project, and the South Baggs Area.

### Conclusions

A systematic review of the NEPA documents prepared since 1993 for oil and gas action in southwest Wyoming shows that BLM complied with the broad principles of the NEPA, made adjustments to analysis content and format in an effort to improve analysis and respond to public comments, and developed a logical system of addressing sequential actions in oil and gas fields. BLM employed a tiered process to reduce the size and shorten the time required to prepare NEPA analysis. There are clear criteria as to when field-level analyses are required and what NEPA level analysis will be prepared. The BLM has clearly and consistently involved the public and federal, state, and local agencies in the scoping and preparation of all NEPA analyses. The BLM has responded when new issues were raised, regardless of the point in the analysis process at which they were raised. The analysis of the scope and treatment of impacts to individual resources has been consistent among the documents.

Public comments on NEPA analyses focus on the use of proper methodology or a lack of clear explanations of the procedure and rationale used to reach a conclusion. Adequacy in these subjects is difficult to measure. What may be sufficient detail for some may be far short for others. This evaluation also identified a need for BLM to prepare complete and comprehensive analyses in a timely, reasonable, and cost-effective manner.

***Recommendation***

1. The Green River Basin Advisory Committee recommendations on NEPA Streamlining are included by reference and should be implemented. One such recommendation is "Improve NEPA documentation and analysis while reducing delays, uncertainty and increased costs associated with that process. . . . Streamline the NEPA process by a 50% reduction of time and paper." (See *GRBAC Final Report to the Secretary of the Interior* for details.)

## NEPA DOCUMENT CHARACTERISTICS

### Acres Analyzed and Disturbed

In addition to statistical information provided in the table on pages 7-9 of the Phase One NEPA Analysis report, the following data have been calculated regarding the listed NEPA analyses (see Table 3) in southwest Wyoming.[5]

- 10.5 percent of the total SWRE surface area has been covered by a project-specific NEPA analysis.
- Of the areas analyzed:
  - 66 percent of the surface is federally owned
  - 30 percent of the surface is privately owned
  - 4 percent of the surface is owned by the State of Wyoming
  - 67 percent of the mineral estate is federally owned
  - 29 percent of the mineral estate is privately owned
  - 4 percent of the mineral estate is owned by the state
  - 1 percent of the area is private surface/federal minerals
- Prior to NEPA analyses, approximately 2 percent of the areas analyzed had been previously disturbed. This is 0.23 percent of the total SWRE surface area. Total disturbance (existing + proposed) was 5.4 percent of the NEPA analyses areas, or 0.57 percent of the total SWRE surface area.
- Of existing and projected disturbance:
  - 58 percent of the disturbance was due to roads—30 percent from unsurfaced oil and gas roads and 28 percent from state and county roads, both paved and unpaved.
  - 17 percent of the disturbance was due to well pads (the average disturbance per well pad was 2.30 acres)
  - 16 percent of the disturbance was due to pipelines
  - 5 percent of the disturbance was due to other oil and gas facilities
  - 4 percent of the disturbance was due to railroads
  - Less than 1 percent of the disturbance was due to towns and cities
- NEPA analysis projected 56 percent of disturbed sites would be reclaimed.
- A 21 percent well abandonment rate for existing wells and a 0.4 percent abandonment rate for new wells (failure of initial drilling) was estimated.

***Conclusion and Recommendation***

1. Tabulation of disturbance, even when measured against a prior existing number, can give an inaccurate measure of impacts. NEPA analysis should be keyed to resource values rather than project impacts. BLM should examine the feasibility of identifying cumulative "threshold" values that would trigger re-evaluation or change of current practices or application of stipulations.

### Alternatives

The type and number of alternatives analyzed in the NEPA documents correlated to the level of the analysis. All EAs, with the exception of the Big Piney/LaBarge Coordinated Activity Plan (CAP) and the Greater Wamsutter, analyzed only the proposed and no action alternatives. The format of the Big Piney/LaBarge CAP was more like a planning analysis than a project proposal in its format, hence a spectrum of alternatives was analyzed. The Greater Wamsutter EA analyzed a minimum, maximum, and no action alternative. The limited scope of alternative analysis in EAs was due to the lack of reasonable or likely variations of drilling when only 10 to 70 wells were proposed, usually in a small project area.

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[5] Other oil fields exist in southwest Wyoming which are not addressed in specific NEPA analyses but are addressed in planning documents (e.g., Patrick Draw, Brady Field, Road Hollow, Painter Reservoir, North and South Baxter, and Nitchie Gulch). These oil and gas analyses are not represented in the following data.

The nature of alternatives in EISs was more variable. All of the EISs analyzed at least the minimum, maximum, and no action alternatives. Some EISs also included a mid-range level of development. The earlier EISs, beginning with Mulligan Draw in 1992 through Stagecoach Draw in 1995, couched the alternatives by the gross number of wells and projected spacing. For example, the proposed action (minimum level) in the Stagecoach Draw EIS called for 72 wells on a 320-acre spacing. The maximum development alternative proposed 144 wells on a 160-acre spacing. This configuration was abandoned in latter analysis because prediction of spacing was too uncertain and authority to set spacing rested with the Wyoming Oil and Gas Conservation Commission (WOGCC), not with the BLM.

In an attempt to improve the analysis of reasonable alternatives, the BLM has tried three different EIS alternative formats since 1995. The Greater Wamsutter II EIS considered low/medium/high numbers of well alternatives and also included assumptions about directional drilling and multiple wells drilled from a single surface location. The Moxa Arch Expanded EIS considered only gross numbers of wells for minimum and maximum alternatives. Finally, the Fontenelle Infill EIS considered the proposed action and a resource protection alternative for a static number of wells. The resource protection alternative prescribed: 1) seeking alternate locations from the typical spacing location to minimize resource conflicts, 2) eliminating well sites when the resource conflict could not be minimized, 3) increasing the seasonal restrictions on drilling and construction activities, and 4) encouraging or requiring consideration of directional drilling, thus placing drill sites away from sensitive resources.

### *Conclusion*

BLM has actively and creatively sought to define alternatives to proposed actions that are reasonable and reflect "real life" possibilities. The analyses have objectively considered all alternatives.

Four factors make it difficult to define clear, precise drilling alternatives:

- Drilling plans change with information gathered from each new drilling effort. Success or failure of any single well may cause a company to increase planned drilling or abandon an area entirely.
- World oil and gas prices influence a company's ability to attract or borrow money for drilling. This affects drilling decisions due to expected returns from produced quantities of petroleum resources. At low prices, marginal or low production wells may not be drilled because the rate of return would not offset drilling costs and repay investments in a reasonable time.
- In areas that are not unitized (drilling in unit areas is controlled by one operator designated to act on behalf of all lease holders), it is difficult to determine precise plans from all lease holders.
- Where BLM does not manage the majority of lands in an area, protection of resources across ownership lines and projection of private drilling plans are difficult.

### *Recommendations*

1. BLM should continue to seek, in collaboration with industry and public interest groups, clear ways to formulate and analyze oil and gas development alternatives.
2. In sensitive resource areas, BLM should continue to encourage industry to increase the use of drilling multiple wells from a single surface location where geologic and economic conditions permit this technique.
3. BLM should continue to work with industry to develop drilling layouts that reduce the amount of surface disturbance.

## Direct/Indirect Impacts

Direct impacts are those resulting from a specific action, for example, habitat or wetland areas lost due to the construction of access roads or well pads. Indirect impacts are those resulting as a consequence of a direct action. For example, vehicle traffic or human presence at a well pad may cause wildlife to temporarily avoid using an area even though suitable habitat may exist.

Direct and indirect impacts are typically addressed concurrently, resource by resource, in an EIS. Some of the shorter EAs do not clearly address indirect impacts. In contrast, the Sierra Madre EA specifically addresses indirect impacts for all resources in a separate section at the end of the direct impacts analysis. The Greater Wamsutter EA, Greater Wamsutter II EIS, and Moxa Arch Expanded EIS begin each resource impact section by identifying significance criteria for direct and indirect impacts. Indirect impacts are discussed separately from direct impacts within each resource section. In every analysis reviewed, quantification of indirect impacts was not extensive.

Recommendations for direct/indirect impacts can be found in the Specific Resource Analysis section which begins on page 27.

## Cumulative Impacts

BLM's cumulative environmental impact analyses have followed the guidelines provided in its October 1988 *NEPA Handbook* (BLM Manual H-1790-1) and other guidance such as BLM's April 1994 publication of *Guidelines for Assessing and Documenting Cumulative Impacts*. Another document, "*The Wildlife Chapter Planning Aids*" was prepared by the Cumulative Impacts Task Force (CITF). It was designed to supplement CEQ's handbook "*Cumulative Effects Analysis—Handbook for NEPA Practitioners.*" The CITF was composed of representatives from BLM, Wyoming Game and Fish Department (WGFD), industry, and conservation groups. It was convened to address concerns identified by BLM Technical Procedures Reviews conducted in 1990 and 1993. Since the early 1990s, EISs have identified cumulative impact analysis (CIA) areas for each resource affected by the proposed action.

Presentation and analysis of cumulative impacts in BLM oil and gas-related NEPA documents have occurred in three formulations. The first grouping contains those analyses where cumulative impacts are not treated in detail and are generally dismissed as inconsequential. Examples of these analyses are the Dripping Rock and Hay Reservoir EAs. This type of analysis is limited to EAs prepared prior to 1992 and is no longer employed by the Bureau.

A second formulation of cumulative analysis presents the information in a separate section at the end of the impacts chapter. This format was used in only three analyses, Mulligan Draw, Stagecoach Draw, and Essex Mountain. In the most comprehensive example of this format, the Stagecoach Draw EIS, separate CIA areas are defined for each affected resource. Each resource is discussed individually, in its own subsection.

The most common formulation is that in which cumulative impacts for each resource are addressed within that particular resource section of the impacts chapter. For example, a typical impacts chapter would have the following subsections:

- Introduction—Explanation of particular resource considerations, identification of impact definitions, and other pertinent information.
- Resource Management Objectives and Impact Significance Criteria—Identification of RMP decisions (an example of tiering or referencing from the RMP) and explanation of the rationale BLM used to choose significance criteria.
- Direct and Indirect Impacts—Discussion of the impacts attributable to the project for each alternative and the no action alternative.
- Mitigation Summary—Presentation of mitigation measures proposed by the applicant or recommended by BLM, disclosure of where and how these measures are applied, and discussion of the influence these measures have upon impacts.
- Cumulative Impacts—Impacts from other proposed projects, existing facilities, and activities within a defined CIA are presented here.
- Residual Impacts—Identification of those impacts that cannot be mitigated or avoided.

BLM's treatment of cumulative impacts has evolved as these analyses have become more sophisticated. An early analysis (Greater Wamsutter EA) did not identify a CIA area, tied cumulative impacts to other projects (but did not provide a comprehensive inventory of those projects), did not quantify cumulative impacts, and frequently dismissed the possibility of cumulative impacts. For example, when discussing cumulative impacts to an antelope herd, the report concluded, "The antelope herds are currently above their objective levels, therefore no cumulative impacts are occurring."

The first major change to cumulative analysis was to define a CIA area for each affected resource, done for the first time in the Creston/Blue Gap EIS. Here the CIA area was generally based on watershed boundaries, but this boundary was not used for all resources. Some resources were asserted to sustain no cumulative impacts (e.g., cultural, paleontological, and visual resources) while different boundaries were applied to other resources (e.g., herd units for big game species). Selection of the CIA area has been variable in subsequent documents.

The Expanded Moxa Arch EIS defines CIA areas as watersheds and big game herd units as covered in two previous analyses plus a surrounding buffer area (for recreation and visual resources) that varies from 1-12 miles. Expanded watersheds and herd units area are also used as CIA areas.

The Fontenelle EIS identified the CIA area on township boundaries from 1-19 miles around the project area. Watersheds boundaries are also considered in analyzing cumulative impacts to soils, water, and vegetation. However, the cumulative analysis section is focused on crucial winter range within the herd unit (the habitat component considered most critical to the species affected).

Another step in the evolution of CIA is the increase in detail and quantification of information in the cumulative analysis. The Fontenelle EIS is the best example in that extensive enumeration of wells, roads, pipelines, and acres disturbed (among others) in the CIA area is tied to impacts in the project area. The Fontenelle EIS is the only analysis that contains such an extensive level of cumulative impact data. The EIS also includes habitat modeling as a means of determining the extent to which high quality habitat would be affected by the proposed action and alternatives.

The next evolutionary step in cumulative impact analysis will be to incorporate all existing BLM and CEQ guidance into analysis techniques and to move CIA area identification from a "buffer" criteria to an ecosystem-based delineation keyed to specific resource characteristics. Thus, one CIA area may not be sufficient for the analysis. The Continental Divide/Greater Wamsutter EIS will follow this arrangement.

### *Conclusion*

BLM cumulative impact analysis shows a purposeful and steady evolution in response to public comment and agency review. The cumulative analysis has become more comprehensive and more closely tied to affected resources. BLM cumulative impact guidance was released in April 1994 and has continued to expand on such guidance by preparing the "Wildlife Chapter Planning Aids" document.

A more consistent approach to cumulative impact analysis is needed. Emphasis should be placed on the resources affected rather than on project impacts. The evaluation shows a need to clarify agency roles and responsibilities and to build cooperation with other agencies. Disagreements over technical analysis procedures need to be resolved.

### *Recommendations*

1. All new NEPA analyses should continue to include application of the appropriate guidance on cumulative impact analysis from the CITF's The Wildlife Chapter Planning Aids; the CEQ's Cumulative Effects Analysis—Handbook for NEPA Practitioners; the BLM NEPA Handbook (BLM Manual H-1790-1); and other guidance such as BLM's Guidelines for Assessing and Documenting Cumulative Impacts. These principles should be applied to all resources.
2. If practicable, BLM should develop cumulative impact forecasting models that are reasonable and easy to use.
3. BLM should include current and historic big game and special status wildlife population data for the appropriate CIA area in future cumulative impact analyses. The CIAs should include the identification of all existing and reasonably foreseeable development within the CIA area(s) (e.g., surface disturbance, facilities, activity).

## NEPA Impact Predictions

BLM has employed inspection and monitoring efforts on oil and gas actions conducted on public lands in some areas for over 30 years. These are described on pages 33-35. These efforts were generally directed at ensuring compliance with the terms and conditions of authorizations for individual approvals. In the last ten years, BLM has devised comprehensive monitoring plans that evaluate impacts to or reactions of specific resources. BLM has not conducted a deliberate check of NEPA analysis impact prediction accuracy or monitored resource changes in southwest Wyoming.

## SPECIFIC RESOURCE ANALYSIS

Overall, the format and content of individual resource impact analyses have not varied. However, the amount of detail for each resource has varied with the size of the proposal. The more wells proposed and the longer the project period, the more detail is provided about affected resources. Since 1985, some resources have drawn few comments and it appears the public is generally unconcerned about impacts to these resources or views the effects as beneficial. These resources include cultural and paleontological resources, recreation, and socioeconomic conditions. Grazing activities also do not appear to be adversely affected by oil and gas activities unless road construction does not take ranching access needs into consideration. Loss of forage for livestock grazing has not been an issue of great concern.

The following individual resources have received a high degree of comment in the analysis process.

**Air Quality/Wilderness.** Direct or physical impacts to wilderness or wilderness study areas are not permitted by law and have not been an issue in oil and gas analyses even when the project area has abutted a wilderness study area. However, emissions can cause visibility impacts to wilderness areas (known as Class I areas).

Since 1983, BLM has identified air quality as a potential issue during its scoping of NEPA analyses. However, air quality did not receive great attention until comments were received on the Draft Expanded Moxa Arch and Fontenelle EISs in April of 1995. It is now one of the most sensitive issues BLM must address in its analyses. BLM modeled existing and projected emission rates and incorporated the data into the Final EISs for these two projects. Disagreement about model applicability, model assumptions, thresholds, and agency authority have prevented quick resolution of this issue. The BLM is working with the EPA, FS, and the Wyoming DEQ-AQD to reach consensus on the above air quality issues. In recognition of, and in the furtherance of resolving this issue, the governor of Wyoming established the Interagency Committees on Air Quality. The function of the committees is to reach agreement on the elements affecting air quality in southwestern Wyoming and to coordinate information and policy considerations. Although these committees have no intrinsic authority, they will complete their commissioned tasks and submit recommendations to the governor for action.

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The general tasks of the Interagency Committees on Air Quality are summarized as follows:

- The Green River Basin Visibility Study Steering Committee (established in 1994) will address visual air quality (visibility) concerns in southwest Wyoming. The intent of the study is to collect baseline data to aid in future management decisions.
- The University of Wyoming will address air pollution entering Wyoming from outside the state and characterize the pollutants' chemical composition to assist visibility assessments in southwestern Wyoming.
- SWTAF is strictly a coordinating body, the sole purpose of which is to coordinate data, analysis, and policy considerations and to reach consensus regarding air quality management in southwest Wyoming. The SWTAF, in addition to the BLM, FS, EPA, and DEQ-AQD, includes representatives from industry, the environmental community, and Indian tribes.

The information and recommendations resulting from the interagency committees will aid future federal and state air quality analyses.

The Clean Air Act, 42 USC 7401, provides the framework for the protection of air quality through state programs approved by the EPA. The 1977 amendments to the Clean Air Act established provisions for Prevention of Significant Deterioration (PSD) of air quality, including Class I areas. The State of Wyoming has the authority and responsibility to regulate air quality impacts within the state, including Class I areas. The primary goals for visibility protection are found in Section 169A, of the Clean Air Act. The State of Wyoming, through the EPA-approved *State Implementation Plan* (SIP), is to progressively work towards achieving the national goal of preventing and remedying any impairment of visibility in Class I wilderness areas. The role of the federal land manager in accomplishing this and in the administration of the wilderness area air quality-related values (AQRV) is to participate in the development and revisions of the SIP.

Air Quality Mitigation Program—The Wyoming DEQ requires that Best Available Control Technology (BACT) be applied for all air quality permits. Wyoming DEQ requires that a site-specific BACT analysis be conducted by the proponent as part of its preconstruction permit application.

Air Quality Monitoring—The BLM cooperates in existing visibility and atmospheric deposition impact monitoring programs. The need for and the design of additional monitoring will include the involvement of the SWTAF and Green River Basin Visibility Committee.

### *Conclusion*

Prior to 1995, BLM addressed air quality issues in NEPA analyses to the extent required by public interest and the Clean Air Act. When notified of possible violations of air quality standards, BLM incorporated modeling and impact studies into two final EISs. BLM has actively participated in interagency committees and worked to establish standard air quality evaluation and monitoring procedures. Discussions continue about agency authority, interpretation of model applicability, and assumptions and interpretation of results. The following recommendations identify the technical issues the interagency committees are working to resolve. These recommendations are the next logical step beyond clarification of agency policy and coordination issues identified on page 16 of this report.

### *Recommendations*

1. In cooperation with EPA, DEQ, and USFS, the current baseline of pollutants (TSP, $PM_{10}$, VOC, CO, $NO_x$, $SO_2$, and HAP) at sensitive receptor sites should be determined. Any trends in pollutant concentrations should be identified.
2. In cooperation with EPA, and DEQ, the type and average amount of emission from individual oil and gas equipment (e.g., methanol pumps, glycol pumps, condensate storage tanks, separators, heaters, dehydrators, and compressors) should be determined and used consistently in planning/NEPA documents.
3. In cooperation with EPA, USFS, and DEQ, emission sources within and without the SWRE area should be identified. The transport fate of these emissions relative to receptors in and adjacent to the SWRE should be included in modeling efforts.
4. In cooperation with EPA, USFS, and DEQ, air quality models (pollutant concentration and visibility models) for use in impact analysis and Clean Air Act conformance determination should be selected as soon as possible.
5. The feasibility of using modeling trials to define facility density and layout that would violate Clean Air Act standards should be examined. If proposals did not exceed the site criteria, then project modeling would not be required.

**Transportation.** Transportation is not a resource. However, roads and vehicle use do affect the quality of the human environment. Roads may reduce wildlife habitat and increase erosion and dust. Early NEPA analyses did not address transportation issues in sufficient detail. Later documents have attempted to quantify number and frequency of trips that would be generated by a project. The Green River Basin Advisory Committee (GRBAC) recommended that BLM put more emphasis on transportation planning and analysis with the objectives of: 1) using road designs that minimize the amount of acreage disturbed and reduce environmental damage, 2) providing the shortest, fewest, and safest routes to and within the project area, and 3) providing for reclamation of unnecessary and unneeded roads. In recent analyses (Jonah II, Continental Divide/Greater Wamsutter II), BLM has developed a transportation plan for major access roads within the project area as part of the Draft EIS rather than as a post-analysis exercise with little or no public involvement. Recent analyses (since 1992) have also made generalized assumptions about big game displacement from frequently-traveled roads.

### *Conclusion*

BLM has traditionally attempted to minimize road-related impacts by: 1) improving two-tracks rather than building on new alignments (where safety and terrain situations allowed), 2) using minimum width designs to meet the need, 3) setting roads back from sensitive resources such as raptor nests, sage grouse leks and cultural resources, and 4) setting seasonal construction restrictions in sensitive habitats such as crucial winter ranges and breeding areas.

Recognizing that roads contribute 58 percent of direct oil and gas-related disturbance in addition to most of the indirect impacts, BLM switched from a post-NEPA transportation planning process to one conducted concurrently with the NEPA analysis. There is a continuing need to understand displacement effects of traffic volume, traffic type, and use on wildlife populations and recreational uses.

### *Recommendations*

1. In cooperation with interested parties, BLM should evaluate the effects of traffic level, vehicle mix, or road density on displacement of:
    - Antelope
    - Mule Deer
    - Elk
    - Sage Grouse
    - Raptors
2. In cooperation with interested parties, BLM should evaluate the displacement of wildlife by vehicle movement and human activity around vehicles and should correlate effective habitat loss with traffic volume.
3. BLM should evaluate the amount of non-oil and gas-related traffic generated by new road construction. The evaluation should consider oil and gas field development levels and recreational use over a period of years.
4. BLM should evaluate factors that influence non oil and gas-related traffic volumes and trip destinations. Factors may include recreation sites, hunt areas, and proximity to and size of population centers.
5. BLM should evaluate the reasonableness and cost effectiveness of co-locating roads and pipelines.
    - How much surface disturbance is actually reduced?
    - Does it reduce costs?
    - Are there areas or circumstances where co-location should be optional?
6. BLM should continue to implement the GRBAC Road Standards Recommendations including the determination of what types of road surfacing should be required.
7. BLM, in cooperation with state and local agencies, landowners/livestock operators, and public land users should:
    - develop guidelines for identifying unnecessary road segments.
    - establish a policy which balances the provision of safe roads with the minimization of surface disturbance.
    - establish guidelines and criteria on when to use and upgrade two-track roads or establish a new road.

**Water Resources.** This issue includes surface and groundwater quality, impacts to wetland and riparian areas, and erosion control and reclamation practices. Analyses have assumed groundwater impacts are avoided by adequate casing and cementing programs during drilling. Surface water impacts in the Red Desert Basin (a closed hydrologic basin) have not been an issue. However, water quality impacts in the Green River Basin (a tributary of the Colorado River) are a concern. Recent analyses have begun to quantify erosion rates and sedimentation levels attributable to oil and gas actions. Objectives of these analyses are to demonstrate compliance with the Clean Water Act, Wyoming Water Quality Standards, and the Colorado Salinity Control Act. Existing planning decisions prohibit surface disturbance within 500 feet of wetlands and riparian areas, minimizing impacts to these areas.

The BLM Erosion Control, Revegetation, and Restoration Plan (ERRP) and Wyoming DEQ Stormwater Pollution Prevention Plan (SPPP) are synonymous and complement each other in their intent. The DEQ Storm Water Regulations, Section 402(p) of the Clean Water Act, require the regulation of storm water discharges under the National Pollutant Discharge Elimination System (NPDES) program. The state requires a general permit for storm water discharges associated with "'industrial' discharges where five or more surface acres are disturbed." Best management practices (BMP) must be applied to control off-site sedimentation from construction activities. BLM's ERRP allows for cooperative innovation in site development and reclamation of a disturbed area to a predetermined land use for well field and treatment plant activities. Reclamation monitoring is an integral component to ensure successful revegetation, site stabilization, and functioning sediment/erosion control structures.

In compliance with the Clean Water Act, BLM is cooperating with the DEQ-Water Quality Division in the implementation of Wyoming's water quality program, particularly in the establishment of priorities for Water Quality Limited Segments (WQLS) and developing Total Maximum Daily Loads (TMDL) for these waters.

### *Conclusion*

BLM has identified avoidance (no surface occupancy) areas based on soil types, topography, and geologic features as part of its land use planning process to prevent unacceptable impacts. BLM has complied with federal and state water quality laws. There are no known violations of these standards. Water quality, erosion prevention, and reclamation practices have been in place for over a decade. No noticeable impairment of resources has been documented, and these practices appear to be adequate. However, new requirements are being developed (e.g., TMDLs), and comprehensive monitoring of the effectiveness of these measures is warranted.

### *Recommendations*

1. BLM should continue to evaluate erosion control mitigation measures for their effectiveness.
2. BLM should continue its cooperation and consultation with the State of Wyoming in the implementation of EPA's water quality program, quantify sedimentation impacts to the Green River Basin from oil and gas-related activities, and adopt standard evaluation methodology.
3. BLM, in cooperation with oil and gas operators, landowners, DEQ-Land Quality Division, University of Wyoming, FS, counties, and other interested parties, should continue to hold reclamation workshops to discuss and evaluate the effectiveness of reclamation practices. The workshops should:
   a) Evaluate the following reclamation techniques/practices for effectiveness:
      - topsoil stockpiling
      - ripping, pitting, or use of snow fencing to trap snow
      - seeding application techniques, use of nurse crops
      - fencing to exclude livestock
      - seed mixtures

   b) Prepare a description of a typical scenario of revegetation succession.

   c) Evaluate the effectiveness and appropriateness of noxious weed control methods.
4. BLM should continue its proper functioning condition assessments to identify and quantify status and trends in wetland and riparian areas.
5. BLM, in cooperation with the Wyoming DEQ-Water Quality Division, should continue to identify types or classes of streams that should be monitored for surface water quality impacts from oil and gas activities.
6. BLM, in cooperation with the Wyoming DEQ-Water Quality Division, should continue to identify the trends in surface water quality for impaired drainages in southwest Wyoming. This should include the determination of the relationship between oil and gas activity and the trends.
7. BLM, in cooperation with the WGFD and the USFWS, should determine if any surface water quality trends are affecting fisheries.
8. BLM should continue to ensure that the USFWS and USGS identified flood-prone areas are avoided in oil and gas development.
9. BLM, in cooperation with the State Engineers Office, Petroleum Association of Wyoming, and the WOGCC, should continue to consider and evaluate, where deemed necessary, the effectiveness of cementing and completion practices to protect aquifers, casing corrosion rates, and the casings' potential to fail and contaminate aquifers.

**Visual Resources.** A great amount of concern has been expressed about visual resources since 1992. Of particular concern is the development within areas of previously undisturbed landscapes or, as some refer to it, landscape "industrialization." To evaluate visual changes, BLM uses a visual resource management (VRM) classification system based on the factors of form, line, color, and texture. In accordance with BLM's VRM land classification program, RMPs classify the visual resources in southwest Wyoming as Class I, Class II, Class III, or Class IV. Each class has an objective which prescribes the amount of change allowed in the characteristic landscape. This classification process has been employed in varying degrees in oil and gas environmental impact analyses. The Expanded Moxa Arch Natural Gas Development Project is a typical example of the visual classification makeup of a project area, i.e., Class I=0 percent; Class II=4 percent; Class III=19 percent; and Class IV=77 percent. Development that does not meet the VRM classification may constitute a significant impact to the environment.

Change in visual resource characteristics is difficult to quantify because individuals' opinions about good and poor landscapes vary greatly.

### *Conclusion*

BLM has consistently applied visual resource classification procedures to oil and gas action in southwest Wyoming and employed mitigation measures such as painting schemes to reduce facility visibility. Changes to rural landscapes from development of oil and gas facilities are difficult to mitigate, especially in a checkerboard land ownership pattern.

### *Recommendations*

1. BLM should evaluate oil and gas facility visual impacts in southwest Wyoming, considering such issues as:
    - At what distance do they become unnoticeable?
    - How does density affect facility visibility?
    - Are there sensitive visual areas that should have additional protective lease stipulations?

**Wildlife.** Along with air quality and cumulative impacts, wildlife is a resource of great concern in southwest Wyoming. Direct loss of habitat, animal displacement by human activity, and the accumulated effects of habitat loss throughout a species' range are the most pressing concerns.

BLM consistently quantified the direct loss of different categories of wildlife habitat (e.g., yearlong/summer, winter, and crucial winter range) in all of the documents reviewed. Assumptions about displacement or indirect loss of habitat have also been made. This habitat loss is correlated with high levels of human activity around well pads and on oilfield access roads. Wildlife professionals do not always agree as to the extent of this impact because different species of animals react differently to various types and levels of human activity, individuals within a species react differently to human presence, other environmental factors may influence and act in concert with oil and gas activity, and the scientific literature is inconclusive about the exact intensity of this type of impact.

BLM has focused its wildlife impact analyses on loss of habitat (the management responsibility of BLM) and not on the loss or effect to populations or herd numbers (the management responsibility of WGFD). Herd population trends have generally not been identified.

BLM consistently employed measures to protect crucial winter ranges, raptor and sage grouse nesting areas, and big game birthing areas. Wildlife professionals have generally acknowledged that the employed measures of protection (initially analyzed and adopted in RMPs) will minimize but not eliminate impacts to these species. Only in the more recent (since 1994) NEPA analyses have additional measures been considered. For example, in the Fontenelle EIS the following additional wildlife protection measures were proposed in the resource protection alternative:

- Minimizing the number and length of roads by reclaiming two-track and other roads/trails not needed for oil and gas development/operations, grazing, or recreation.
- Restricting human visits to well sites in crucial winter ranges to nonfeeding time periods.
- Constructing artificial nesting structures to encourage raptor nesting away from oil and gas facilities.
- Establishing a "controlled surface use" restriction for above-ground facilities within 825 feet of raptor nests and 1790 feet of eagle nests to ensure propagation of the species.
- Flagging or covering pits to minimize deaths of migratory birds.
- Preparation and implementation of a wildlife protection and impact mitigation plan to identify and standardize environmental protection and mitigation measures which will avoid, minimize, or reduce impacts to wildlife. The plan will be developed to meet specified goals. Example of goals are:
    - Avoid unnecessary construction-related disturbance to wildlife habitat.
    - Monitor wildlife use of the area on a regular basis and systematically record changes in wildlife use.
    - Monitor the effectiveness of wildlife protection and impact mitigation measures.

### *Conclusion*

BLM has mitigated direct impacts to wildlife resources by seasonally restricting construction activities in crucial winter ranges and nesting habitats and by prohibiting surface disturbance within various distances of raptor nests and sage grouse leks. However, wildlife impacts continue to be the most controversial and complex issue concerning oil and gas development due in a large part to the uncertainty about secondary impacts. The effectiveness of current practices has been only partly evaluated.

Control and management of wildlife species is the responsibility of the WGFD. BLM manages habitat in a multiple use concept with these wildlife species in mind.

### *Recommendations*

**Big Game**

1. BLM, in cooperation with the WGFD and land owners, should evaluate and identify the current status and trends of crucial winter range.
2. BLM, in cooperation with the WGFD, should evaluate the effect of oil and gas activities on big game migration.
3. BLM, should continue to support the WGFD in its efforts to evaluate the current status and trends of herd populations and factors affecting populations (e.g., climate, vegetation, hunting, habitat loss, disease).

**Raptors.** The following topics apply to bald eagle, golden eagle, ferruginous hawk, roughed-legged hawk, Swainson's hawk, red-tailed hawk, and burrowing owl.

4. BLM, in cooperation with the WGFD and USFWS, should continue to evaluate the current status and trends of nests and reproductivity.
5. BLM, in cooperation with the WGFD and USFWS, should continue to evaluate the effectiveness of setback distances to protect nesting birds. Consistent buffer zones and restriction dates for raptor nests (by species if appropriate), and winter roosting areas should be established on a statewide basis. These changes to RMPs should be maintenance actions.
6. BLM, in cooperation with the WGFD and USFWS, should continue to investigate the interrelationships between raptor reproduction, prey base, and oil and gas activity.

**Threatened and Endangered Species.** The following topics apply to black-footed ferret, swift fox, Colorado River fishes, and various plant species.

7. BLM, in cooperation with the WGFD and USFWS, should continue to identify the known locations or critical habitats of these species.
8. BLM, in cooperation with the WGFD and USFWS, should evaluate the effect of ferret search requirements on oil and gas operations. Can ferret search requirements be made more efficient? Is there justification for reducing the search requirements?

**Sage Grouse**

9. BLM should continue to support the WGFD in its efforts to identify the current status, trends, and factors affecting those trends of the species in southwest Wyoming.

**General Wildlife**

10. BLM should continue to quantify direct and indirect habitat loss by individual type of oil and gas action and cumulatively, applying the CITF and other guidelines, by habitat type or area.
11. BLM, in cooperation with the WGFD, should continue to evaluate the relationship between wildlife population changes and/or poaching levels and oil and gas-related road construction.
12. BLM, in cooperation with the WGFD and USFWS, should continue to evaluate and determine the mortality rate of avian species at various types of open pits.

**Other**

13. In sensitive wildlife use areas, BLM should work with industry to increase automation of equipment and centralization of facilities in order to reduce the number of trips to well sites.

# CHAPTER FOUR

# OTHER SWRE ELEMENTS

The SWRE also examined allied programs and efforts related to oil and gas development. These include: analysis of all databases for southwest Wyoming resources, monitoring and mitigation practices, landtype delineations, cultural resource evaluation, and socioeconomic analysis. This chapter briefly discusses these five areas.

## DATA ANALYSIS

***The SWRE objective for database analysis is to identify existing databases and inconsistencies among resource area databases and the extent thereof, recommend the format of an ecosystemwide database, a methodology to develop such a database, and a schedule and budget for the same.***

### Summary of Phase One Data Analysis

In Phase One of the SWRE, a total of 86 data themes were evaluated to determine their availability and status. The data themes initially identified were based upon those used for the Green River RMP. Additional data themes will be added to provide the necessary data to address the issues associated with southwest Wyoming. These data themes were mapped by resource area as to their availability and the current status of each data theme.

### Data Adequacy

Approximately one percent of the 86 data themes in the four resource areas was not available during the time of the SWRE. Approximately 49 percent of the data themes listed are already in a digital format. The SWRE did not identify any critical data gaps that would have interfered with the analyses conducted for RMP and NEPA processes over the years. The databases are current, but updating procedures are unclear. Undigitized data themes are scheduled for automation.

The BLM has access to the following databases:

- BLM Resource Area, District and State Office databases
- GIS MOSS/MAP
- GIS ARCINFO
- ALMRS
- Master Title Plats
- Planning databases, digital, mylar and paper
- Wyoming Game and Fish Department
- University of Wyoming GAP Analysis Program
- National Wetlands Inventory
- Premier Data Services, Denver

#### *Conclusion*

The databases available at the time of the NEPA analyses were adequate to do thorough analyses of the projects. The databases are in various formats ranging from paper to digital. Databases from outside the BLM are available and are being accessed.

#### *Recommendations*

1. BLM should give priority and support to bring the priority data themes identified into a digital database and ensure that the databases being used are the most current and accurate database for a particular theme.
2. As new issues arise BLM should prepare, validate and move needed data themes into a digital format.
3. BLM should continue to support the collection of nondigital data in support of issues arising in southwest Wyoming (e.g., air and water quality).
4. BLM should establish an areawide database in an ARCINFO format with a data capture scale no smaller than 1:24,000.
5. BLM should acquire digital orthophoto quads for the Great Divide Resource Area.
6. BLM should establish a schedule and budget for completing the digital database.

## MITIGATION MEASURES

***The SWRE objective for mitigation measures is to determine if prescribed mitigation measures are effective and to identify ecosystemwide operation and design standards.***

Through the planning and NEPA processes, a standard cadre of mitigation measures intended to minimize oil and gas impacts has been developed over the years. Not every measure is listed in every NEPA document nor is every measure worded exactly the same. The majority of these measures are adopted by the proponent as part of the proposed action. Many of these requirements have become standard procedures for the oil and gas industry in southwest Wyoming. These practices are generally accepted as beneficial and minimize impacts.

However, their usefulness and effectiveness have not been specifically evaluated within or outside of the NEPA process.

## Inspection, Enforcement, and Monitoring

BLM's inspection and enforcement program and resource-specific monitoring system ensures the implementation and compliance of specified mitigation measures. The inspection and enforcement program, the Surface Compliance/Protection Inspection Process, is documented in the Automated Fluid Minerals Support System (AFMSS) and/or the Automated Lands and Mineral Records System (ALMRS). The need for resource-specific monitoring is determined through the NEPA process. For example, the Fontenelle EIS identified the need to monitor wildlife use of the area on a regular basis, to systematically record changes in wildlife use, and to monitor the effectiveness of wildlife protection and impact mitigation measures. These measures are standard today for major federal actions.

BLM utilizes four different formal processes for determining whether prescribed construction, drilling, production operation standards, or mitigation measures are implemented and effective.

- **Surface Inspection Program.** This program, in place since the 1960s, is implemented by the resource area surface compliance specialist and involves the monitoring and evaluation of all surface-disturbing activity associated with a project including construction practices, erosion control structures, reclamation practices, road maintenance, well site maintenance, well site reclamation, etc. This monitoring occurs from the time the project is initiated until it is completed/abandoned (reaches the end of its life) and the site acceptably reclaimed. This program is documented in AFMSS or ALMRS.
- **Drilling Inspection Program.** This program, in place since 1982, is implemented by the BLM fluid minerals inspection and enforcement personnel. This inspection and evaluation occurs throughout the drilling period. All aspects of drilling are monitored including surface use (e.g., well site layout, pits, sumps, dust control,), blowout preventer and associated equipment, casing and cementing program, drilling mud program, and other special operations associated with each well. This inspection is documented on BLM Form 3160-10, Inspection Record—Drilling.
- **Production Inspection Program.** Assuming the well is successful, production inspections occur throughout the life of the producing well. This program, in place since 1982, is implemented by the BLM fluid minerals inspection and enforcement personnel in conjunction with the pumper operator. The inspection program includes evaluation of the well site, tanks, facilities, and other equipment for satisfactory condition and operation. The inspections also evaluate gaging and meter calibration, site security, safety and production measurements for royalty determinations. This inspection is documented on BLM Form 3160-11, Inspection Record—Production.
- **Special Mitigation/Monitoring Plans.** As explained above under Wildlife (pages 31-32), implementation associated with major projects (e.g., Fontenelle Infill Development, Moxa Arch Expanded Development) may include the preparation and implementation of special mitigation and monitoring plans. These may be for the purpose of assessing mitigation effectiveness to protect fisheries water quality, assess wildlife displacement, or evaluate visual impact reduction. Since 1984, this program is implemented by the resource area resource specialists in cooperation with the oil and gas operators; the WGFD; DEQ-Water Quality, Air Quality, and Land Quality Divisions; land owners; and/or other affected interests.

For some of the larger projects (e.g., Riley Ridge and Hickey-Table Mountain), BLM established a task force comprised of BLM and FS, WGFD, and company representatives to periodically inspect the project areas to ensure compliance with the project ROD and to evaluate the effectiveness of prescribed mitigation. The task force documented items needing attention (e.g., erosion, poor reclamation, debris) and sent a notice to the unit or lead operator listing required corrective or remedial action. Conversely, operator reclamation found to be acceptable was dismissed from further monitoring requirements.

### *Conclusion*

The existing inspection, enforcement, and monitoring programs being implemented ensure compliance with the required mitigation. The opportunity to modify inappropriate measures to those more suited to the site and/or conditions is inherent in the program. The monitoring programs being implemented for wildlife, reclamation, water quality, erosion, and others provide ample opportunity for the identification of ineffective measures and corrective or remedial action.

### *Recommendation*

1. Working with other interested parties, BLM should develop monitoring systems for those resources where interest, risk, and available personnel resources warrant. A potential list for consideration includes:
    - Air quality
    - Crucial winter range of five big game species

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- Cultural and paleontological resources
- Human economic and cultural systems
- Livestock forage
- Raptor populations
- Recreation resources
- Sage grouse populations
- T & E and special status species
- Visual quality
- Water-related resources
- Wild, free roaming horses

## LANDTYPE DELINEATIONS

These delineations include the location or boundaries of a landtype, its basic elements, trends, sustainability, frequency, surface extent, resources available within each landtype, possible management implication per landtype, and what the biological potential of the landtype would be.

One of the goals of landtype delineations is to provide a point of reference that is recognizable to the individual on the ground. It is through this type of reference that the landtype delineations can be put to a practical use. Landtype delineation can be used to provide distance, area, adjacency, and proximity for features in a region of interest.

The GIS coverage developed through the land typing process permits geographic analysis by joining and uniting coverage that have similar landtype characteristics. This allows a rapid assessment of resources within a particular landtype and the possible impacts of development upon the resources within the area. The delineation of landtypes can also provide analytical tools for understanding the resources and the relationship of the resources to that landtype.

Considerations and/or associations between and among landtypes allows transfer of knowledge from one area to another. An example of the ability to transfer information is that all erosional escarpments have similar erosion/deposition properties. Landtype associations also integrate basic environmental features (geology, geomorphology and geomorphic processes, soils vegetation, wildlife, threatened and endangered species) in ways unique to that type of landtype association.

In addition to the databases that were used to complete the landtype delineations, other resource databases can be used to further define the use and condition of each landtype. Examples of such databases include the WGFD habitat, population and migration data. Also available are the threatened and endangered plant species database, and mineral potential and development data.

Landtype delineations as spelled out in this effort can also be overlaid against watershed delineations to show the interaction between the two and to provide a further scientific breakdown of complexes within any particular watershed.

### *Conclusion*

Landtype delineations can provide valuable insights into resource relationship, especially when used in a GIS context. Use of this system will allow BLM to interface with other agency databases and perform analyses of greater complexity and precision in a shorter period of time. Acceptance of this new system must be a high priority for BLM.

### *Recommendations*

1. BLM should use *Delineations of Landtype Associations for Southwest Wyoming*, a scientifically based, hierarchical system of map units that incorporates ecological principles and processes across a range of scales, as the base for defining management prescriptions to achieve desired goals on the public lands.
2. BLM should host information and training workshops to explain the landtype delineation system. Simple, but constructive examples of its application should be developed and presented. Integration with GIS should be stressed.

## CULTURAL RESOURCE AUTOMATION AND CONTEXT

This project is an effort by the Wyoming Cultural Records Office, in conjunction with BLM, to revise its cultural records and administrative systems in a way that integrates GIS as a key element. Other federal and state agencies and the University of Wyoming are also involved. The project is innovative because it is the first attempt by a western state to revise its cultural records and administrative system integrating GIS.

By integrating state of the art biological and geological data and creating a comprehensive way to access archaeological data, archaeologists will be free to do more research and less clerical work.

This effort is also designed to: 1) bring field archaeologists into the planning process earlier, 2) eliminate repetitive surveys by better identification of areas that have already been inventoried and known sites, and 3) eliminate inventory requirements for low-sensitive areas through development of a predictive model.

The Archaeological Research Issues Report, part of the SWRE Phase One report, is the initial document produced to develop a context for the cultural resources in southwest Wyoming. The report summarizes important research issues for southwest Wyoming archaeology.

### Conclusion

The development of the Wyoming cultural resources context will aid in the management of cultural resources on public lands. It will be able to provide a scientific basis from which to determine cultural resource importance. This will allow officials to make decisions about the level of evaluation needed based upon the known values for the area.

### Recommendations

1. BLM should continue to provide support for completion of the automation of the cultural resource database and context report.
2. BLM should review existing guidance about measures necessary to eliminate or minimize proposed impacts within the viewshed of a historic trail and revise if necessary.
3. BLM should review existing guidance on avoidance/mitigation of effects to Native American sacred sites and graves and revise if necessary.

## SOCIOECONOMIC ASPECTS OF SOUTHWEST WYOMING

The socioeconomic study of the five-county region comprising the SWRE area was prepared by the Department of Agricultural Economics, University of Wyoming. The two-part report covers the five counties of Carbon, Lincoln, Sublette, Sweetwater, and Uinta and was published in two parts. Part I consists primarily of the historical trends and economic characteristics of this five-county analysis region and covers the timeframe from 1975 through 1993. Part II provides greater detail on the economy of southwest Wyoming focusing on those activities in which BLM has management responsibilities. The report provides analytic procedures to measure the economic impacts of existing and future actions.

Accordingly, there are techniques to calculate the value of the economic benefits of the activities in southwest Wyoming in which BLM has a management role. This allows quantification of potential and existing management choices for specified levels of activity such as mineral, recreation (noncomsumptive and consumptive), timber production, and grazing. These techniques also provide a basis for quantifying recreation activities which do not fit the normal economic impact analysis. This is accomplished using a technique that reflects the recreation user's estimate of personal satisfaction expressed in monetary terms to facilitate comparison with other sectors' use value. The SWRE socioeconomic report has also been provided to state, county, and local governments to assist them in doing future socioeconomic analysis in southwest Wyoming.

### Recommendations

1. BLM, in cooperation with the University of Wyoming and other interested parties, should develop guidelines and instructions to ensure that socioeconomic information (e.g., number of mineral-related jobs, revenues, and taxes) is included in future NEPA analysis.
2. BLM, in cooperation with the University of Wyoming and other interested parties, should develop standard methodology to assess and disclose economic effects (revenues and jobs from drilling and operation and maintenance) in NEPA analysis.
3. BLM should reference the SWRE Socio/Economic Evaluation Report for any future socioeconomic analysis prepared for any environmental or planning document in southwest Wyoming.

## CUMULATIVE IMPACT ANALYSIS

From its analysis of the Phase One information, BLM determined that oil and gas-related decisions in the four SWRE resource management plans (RMP) were uniformily consistent with only minor technoical differences in the application of mitigation measures. BLM concludes that its current methods and practices of both assessing impacts from oil and gas development in southwest Wyoming and complying with NEPA are reasonable and appropriate.

## CONCLUSIONS

It is concluded that BLMs current methods and practices of both assessing impacts from oil and gas development in southwest Wyoming and complying with NEPA is reasonable and appropriate based on a record of:

- Compliance with NEPA regulatory requirements
- Examples of improved analysis quality and content
- Demonstrated responsiveness to public concerns
- Balancing development uncertainty, mixed land ownership issues, and multi- developer objectives

## RECOMMENDATION

A seperate cumulative impact assessment for southwest Wyoming is not warrented.

# APPENDIX A

## RESOURCE MANAGEMENT PLAN (RMP) REASONABLY FORESEEABLE DEVELOPMENT STATUS

Projections were made in each RMP of Reasonably Foreseeable Development (RFD) for oil and gas activity. These projections were applied in the NEPA analysis of the RMP to assess impacts and determine the need and extent of mitigation measures. This appendix considers the present status of oil and gas drilling relative to the RFD in each RMP. In other words, what is the level of current drilling activity in relation to the projections made in each RMP.

BLM used information from the April 1998, Petroleum Information/Dwight, "Discover Location, Drilling & Completion Data, Rocky Mountain Region (Dallas, Texas-Denver, Colorado). This data base represents wells approved, drilled, completed and abandoned on private, state, and federal lands. To make the comparison, BLM started with the number of existing wells identified in the RMP, added the number of wells drilled since the RMP date, and deducted the number of well plugged and abandoned. Wells were counted as Plugged and Abandoned (P&A) if they were so listed in the data base or if they had not produced for five years. BLM then compared the calculated number of existing wells to the RFD projection. The table on the following page provides a summary of this data. Detailed information about each RMP follows the table.

Since the beginning of drilling through April 1998, approximately 14,800 wells have been drilled in the Southwest Wyoming Resource Evaluation area. About 9,900 are in a producing status, and 4,900 have been abandoned. Since the conclusion of each RMP an aggregate of 3,790 wells have been drilled and 1,390 abandoned. Some wells counted as abandoned were drilled before the completion of an RMP and would have been counted as an "existing" well in the RMP. We considered a well abandoned, whether drilled and abandoned after the RMP completion date or existing before the RMP completion date but abandoned after that date, as a "credit" or deduct from the RFD total.

### REASONABLY FORESEEABLE DEVELOPMENT STATUS BY RESOURCE AREA

| Resource Area[1] | Existing at RMP Completion[2] | RFD Projection[3] | Total Wells with RFD | Wells Drilled since RMP Completion[2] | Wells P&A'd since RMP Completion[2] | No. Wells Left to Reach RFD |
|---|---|---|---|---|---|---|
| Kemmerer | 1,057 | 3,258 | 4,315 | 878 | 211 | 2,591 |
| Pinedale | 1,066 | 900 | 1,966 | 664 | 253 | 489 |
| Green River | 1,712 | 1,550 | 3,262 | 1,498 | 678 | 730 |
| Great Divide | 3,671 | 1,440 | 5,111 | 750 | 248 | 938 |

[1] Kemmerer Resource Area includes parts of Uinta, Lincoln and Sweetwater Counties. Pinedale Resource Area includes parts of Sublette and Lincoln Counties. Green River Resource Area includes parts of Sweetwater, Sublette, Uinta, Lincoln, and Fremont Counties, and Great Divide Resource Area includes all of Carbon and part of Sweetwater Counties. Wells include those in all ownerships and federal agency management categories.

[2] Existing well counts for the Kemmerer RMP are from January 1986, for the Pinedale RMP, from January 1988, for the Green River RMP, from January 1989, and for the Great Divide RMP, from January 1990.

[3] Kemmerer RFD projection to the year 2010, Pinedale to the year 2005, Green River to the year 2010, and Great Divide to the year 2006.

## KEMMERER RMP

**Background**—The Kemmerer RMP (April 1986) was prepared prior to issuance of BLM's *Supplemental Program Guidance for Energy and Mineral Resources* (BLM Manual 1624, 11/86). This manual provided guidance for oil and gas potential evaluation and preparation of reasonably foreseeable development analysis. BLM Handbook (H-1624-1) titled *Planning For Fluid Mineral Resources* (5/90) provided additional guidance.

Thus the Kemmerer RMP did not include oil and gas potential evaluation analysis of reasonably foreseeable oil and gas development under subsequently issued guidance. However, the RMP did include projections for potential development through the year 2000 (Draft RMP/EIS Appendix G, page 310). The Kemmerer RMP projected a total of 4,171 new wells by the year 2000 on all land ownerships (1,863 well pads in the Overthrust Belt and 2,308 in the east side of the KRA).

In 1986-87, BLM completed the *Hickey Mountain-Table Mountain Oil and Gas Field Development EIS/ROD*. The study area included 45,510 acres of federal (BLM and FS), state, and private ownership. The EIS analyzed and the ROD authorized 56 new production wells and 14 pressure maintenance gas injection wells. This development area corresponds with the east side of the RA. During the period of 1995-97 the *Expanded Moxa Arch Area Natural Gas Development Project EIS/ROD* was completed. This EIS/ROD analyzed oil and gas development within an area of 476,261 acres of mixed (checkerboard) federal, state, and private land ownership. The EIS/ROD analyzed a reasonably foreseeable level of development of 1,325 wells and authorized 729 wells on federal mineral estate. This development area is also located in the east side of the RA.

Thus, Overthrust Belt projections (1,863 wells) plus the east side Moxa Arch and Hickey-Table Mountain EIS projections (1,395 wells) equal approximately 3,258 new wells by the year 2010. When added to approximately 1,057 wells existing at the time each of the documents were prepared (70 wells in Overthrust + 957 wells in Moxa Arch + 30 in Hickey-Table Mountain), approximately 4,315 wells could be drilled by the year 2010 including private, state, and federal land ownership.

**Status**—Petroleum Information/Dwight data indicate that the total number of wells that have been drilled on private, state, and federal mineral estate within the Kemmerer Resource Area Office area of administration (Lincoln, Uinta, and part of Sweetwater Counties, including wells within the Wasatch National Forest Hickey-Table Mountain) since completion of the RMP through April 1998, is approximately 878. Two hundred eleven (211) have been plugged and abandoned during the same period. This indicates that the Kemmerer Resource Area, excluding consideration of the 211 P&A'd wells, is under the projected level of development recognized in the Kemmerer RMP and existing EISs by approximately 2,591 wells.

## PINEDALE RMP

**Background**—The Pinedale RMP (December 1988) was prepared using the *Supplemental Program Guidance for Energy and Mineral Resources* (BLM Manual 1624). Thus the Pinedale RMP did include a determination of oil and gas potential analysis of reasonably foreseeable oil and gas development. However, not available as guidance was the *Planning For Fluid Mineral Resources*.

The Pinedale RMP projected that a total of 900 new wells, of all ownership groups, could be drilled above the existing (1988) level of 1,066 wells by the year 2005. Existing plus new wells would equal approximately 1,966 wells.

The Pinedale RMP assumed that oil and gas exploration and development would continue as it has historically. This would constitute an average of about 45 wells drilled each year for about 20 years (900 wells). Drilling would be within high oil and gas potential areas and within or adjacent to currently producing areas (i.e., based upon information available at time of RMP preparation, it was anticipated that 90 percent of the activity would be west of the Green River, however, it could occur anywhere within the very high/high oil and gas potential area).

**Status**—Petroleum Information/Dwight data indicate that the total number of wells that have been drilled on private, state, federal mineral estate within the Pinedale Resource Area since completion of the RMP through April 1998 is approximately 664, and 253 have been plugged and abandoned. Thus, within the RMP area, existing producing wells (1,066) at the time the RMP was completed (1988) plus new wells drilled (664) as of April 1998 total 1,730 wells. This indicates that the Pinedale Resource Area, excluding consideration of the 253 P&A'd wells, is under the projected level of development recognized in the Pinedale RMP by approximately 489 wells.

## GREEN RIVER RMP

**Background**—The Green River RMP (September 1997) includes a projection of reasonably foreseeable oil and gas development and provides a cumulative impact analysis. The Green River RMP projected a total of 1,550 new wells of all ownership groups (1,300 oil/gas wells and 250 coalbed methane wells) could be drilled above the existing (1989) level of 1,712 wells over the next 20 years (1990 to 2010). It was estimated that 1,019 wells (819 oil/gas wells at a 0.63 success ratio, and 200 coalbed methane wells) would be successful and 531 wells (481 oil/gas wells and 50 coalbed methane wells) would be plugged and abandoned. Existing plus new wells would equal approximately 3,262 wells drilled by the year 2010.

**Status**—Petroleum Information/Dwight data indicate that the total number of wells that have been drilled on private, state, federal mineral estate within the Green River Resource Area (Sweetwater, Lincoln, Uinta, Sublette, and Fremont Counties) from 1989 through April 1998 is approximately 1,498 and 678 have been plugged and abandoned. This indicates that the Green River Resource Area, excluding consideration of the 678 P&A'd wells, is under the projected level of development (1,550 federal wells) recognized in the Green River RMP by approximately 730 wells.

## GREAT DIVIDE RMP

**Background**—The Great Divide RMP (November 1990) was prepared using the *Supplemental Program Guidance for Energy and Mineral Resources* (BLM Manual 1624) and the BLM Handbook (H-1624-1), *Planning For Fluid Mineral Resources*. The Great Divide RMP includes a projection of reasonably foreseeable oil and gas development and provides a cumulative impact analysis. The Great Divide RMP projected a total of 1,440 new wells of all ownerships could be drilled above the existing (1990) level of 3,671 wells over the next 20 years (1986 to 2006) within Sweetwater (eastern portion), Carbon, Albany, and Laramie Counties. Existing (1990) plus new wells would equal approximately 5,111 wells.

It was assumed in the RMP that oil and gas exploration and development would continue at a projected average growth rate of 0.725% per year in new wells over the next 20 years. The projected 1,440 new wells would be drilled on private, state and federal mineral estate in the planning area over the next 20 years. This would constitute an average of about 72 wells drilled each year. Future drilling success is expected to increase as most drilling would occur within Known Geologic Structures (KGSs) and high oil and gas potential areas.

**Status**—Petroleum Information/Dwight data indicate that the total number of wells that have been drilled on private, state, federal mineral estate within the Great Divide Resource Area (eastern portion of Sweetwater and all of Carbon Counties) since completion of the RMP through April 1998 is approximately 750 wells and 248 have been plugged and abandoned. This indicates that the Great Divide Resource Area excluding consideration of the 248 P&A'd wells, is under the projected level of development recognized in the Great Divide RMP by approximately 938 wells.

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# APPENDIX B

# LIST OF RECOMMENDATIONS

## LAND USE PLANS

***Resource Occurrence, Data Availability, and Public Input into RMPS*** (p. 15)

1. BLM, in cooperation with the FS, Wyoming Department of Environmental Quality (DEQ), and the Environmental Protection Agency (EPA), should adopt the Southwest Wyoming Technical Air Forum's (SWTAF) recommendations and issue an air quality analysis policy to: 1) define the BLM's authority, need, and ability to measure, monitor, or use other agency air quality data; 2) ensure that emission rates from oil and gas facilities used in modeling are accurate; 3) ensure that BLM has the expertise to adequately address the science of air quality; 4) work with other agencies to agree upon regional emission standards/thresholds, and limits; 5) comply with Wyoming DEQ-AQD prescribed "best available control technology" to limit emissions from facilities on public land; 6) determine if emission standards are currently being exceeded; and 7) seek improved practices if warranted.

   BLM should continue to support the Wyoming governor's recognition of the air quality issues in southwest Wyoming. BLM should continue to participate in SWTAF to reach agreement on the parameters affecting air quality in southwest Wyoming, and to coordinate information and policy considerations. BLM should continue to participate in the development and revisions of the Air Quality State Implementation Plan (SIP).

2. BLM should clarify Mineral Leasing Act (prevention of drainage and conservation of mineral resources) and NEPA/FLPMA (protection and multiple use of natural resources) requirements to employees and interested parties.

***Consistencies/Inconsistencies*** (p. 18)

1. BLM field office staffs should review the inconsistencies listed above (and any others that may be subsequently identified) and conduct plan maintenance actions, if determined appropriate. This is consistent with BLM policy to maintain rather than revise plans.

2. BLM should complete an analysis of the Kemmerer RMP to determine the need for plan maintenance under the application of the Supplemental Program Guidance for Energy and Mineral Resources and the Planning for Fluid Minerals Resources Handbook.

3. BLM should evaluate the Pinedale RMP to determine whether there have been any unacceptable environmental effects during plan implementation (43 CFR 1610.4-9). The evaluations should focus on multiple use decisions including resource allocations and planned mitigation measures (BLM Manual 1616.9).

4. BLM should review the designation of utility corridors and ROW placement guidelines in RMPs. A final recommendation should be made and consistently applied regarding the need to designate corridors.

5. BLM should establish consistent buffer zones and restriction dates for raptor nests (by species if appropriate), winter roosting areas, and sage and sharp-tailed grouse leks. These changes to RMPs should be maintenance actions.

## NEPA ANALYSIS

***Level of NEPA Analysis*** (p.24)

1. The Green River Basin Advisory Committee recommendations on NEPA Streamlining are included by reference and should be implemented. One such recommendation is "Improve NEPA documentation and analysis while reducing delays, uncertainty and increased costs associated with that process. . . .Streamline the NEPA process by a 50% reduction of time and paper." (See GRBAC *Final Report to the Secretary of the Interior* for details.)

***NEPA Document Characteristics*** (p. 24)

1. Tabulation of disturbance, even when measured against a prior existing number, can give an inaccurate measure of impacts. NEPA analysis should be keyed to resource values rather than project impacts. BLM should examine the feasibility of identifying cumulative "threshold"values that would trigger re-evaluation or change of current practices or application of stipulations.

***Alternatives*** (p.25)

1. BLM should continue to seek, in collaboration with industry and public interest groups, clear ways to formulate and analyze oil and gas development alternatives.

2. In sensitive resource areas, BLM should continue to encourage industry to increase the use of drilling multiple wells from a single surface location where geologic and economic conditions permit this technique.

3. BLM should continue to work with industry to develop drilling layouts that reduce the amount of surface disturbance.

**Cumulative Impacts** (p.27)

1. All new NEPA analyses should continue to include application of the appropriate guidance on cumulative impact analysis from the CITF's The Wildlife Chapter Planning Aids; the CEQ's Cumulative Effects Analysis—Handbook for NEPA Practitioners; the BLM NEPA Handbook (BLM Manual H-1790-1); and other guidance such as BLM's Guidelines for Assessing and Documenting Cumulative Impacts. These principles should be applied to all resources.
2. If practicable, BLM should develop cumulative impact forecasting models that are reasonable and easy to use.
3. BLM should include current and historic big game and special status wildlife population data for the appropriate CIA area in future cumulative impact analyses. The CIAs should include the identification of all existing and reasonably foreseeable development within the CIA area(s) (e.g., surface disturbance, facilities, activity).

## SPECIFIC RESOURCE ANALYSIS

***Air Quality/Wilderness*** (p.28)

1. In cooperation with EPA, DEQ, and FS, the current baseline of pollutants (TSP, PM10, VOC, CO, NOx, SO2, and HAP) at sensitive receptor sites should be determined. Any trends in pollutant concentrations should be identified.
2. In cooperation with EPA and DEQ, the type and average amount of emission from individual oil and gas equipment (e.g., methanol pumps, glycol pumps, condensate storage tanks, separators, heaters, dehydrators, and compressors) should be determined and used consistently in planning/NEPA documents.
3. In cooperation with EPA and DEQ, emission sources within and without the SWRE area should be identified. The transport fate of these emissions relative to receptors in and adjacent to the SWRE should be included in modeling efforts.
4. In cooperation with EPA and DEQ, air quality models (pollutant concentration and visibility models) for use in impact analysis and Clean Air Act conformance determination should be selected as soon as possible.
5. The feasibility of using modeling trials to define facility density and layout that would violate Clean Air Act standards should be examined. If proposals did not exceed the site criteria, then project modeling would not be required.

***Transportation*** (p.29)

1. In cooperation with interested parties, BLM should evaluate the effects of traffic level, vehicle mix, or road density on displacement of:
    - Antelope
    - Mule Deer
    - Elk
    - Sage Grouse
    - Raptors
2. In cooperation with interested parties, BLM should evaluate the displacement of wildlife by vehicle movement and human activity around vehicles and should correlate effective habitat loss with traffic volume.
3. BLM should evaluate the amount of non-oil and gas-related traffic generated by new road construction. The evaluation should consider oil and gas field development levels and recreational use over a period of years.
4. BLM should evaluate factors that influence non oil and gas-related traffic volumes and trip destinations. Factors may include recreation sites, hunt areas, and proximity to and size of population centers.
5. BLM should evaluate the reasonableness and cost effectiveness of co-locating roads and pipelines.
    - How much surface disturbance is actually reduced?
    - Does it reduce costs?
    - Are there areas or circumstances where co-location should be optional?
6. BLM should continue to implement the GRBAC Road Standards Recommendations including the determination what types of road surfacing should be required.
7. BLM, in cooperation with state and local agencies, landowners/livestock operators, and public land users should:
    - develop guidelines for identifying unnecessary road segments.
    - establish a policy which balances the provision of safe roads with the minimization of surface disturbance.
    - establish guidelines and criteria on when to use and upgrade two-track roads or establish a new road.

***Water Resources*** (p. 30)

1. BLM should continue to evaluate erosion control mitigation measures for their effectiveness.
2. BLM should continue its cooperation and consultation with the State of Wyoming in the implementation of EPA's water quality program, quantify sedimentation impacts to the Green River Basin from oil and gas-related activities, and adopt standard evaluation methodology.
3. BLM, in cooperation with oil and gas operators, landowners, DEQ-Land Quality Division, University of Wyoming, FS, counties, and other interested parties, should continue to hold reclamation workshops to discuss and evaluate the effectiveness of reclamation practices. The workshops should:
   a) Evaluate the following reclamation techniques/practices for effectiveness:
      - topsoil stockpiling
      - ripping, pitting, or use of snow fencing to trap snow
      - seeding application techniques, use of nurse crops
      - fencing to exclude livestock
      - seed mixtures

   b) Prepare a description of a typical scenario of revegetation succession.

   c) Evaluate the effectiveness and appropriateness of noxious weed control methods.
4. BLM should continue its proper functioning condition assessments to identify and quantify status and trends in wetland and riparian areas.
5. BLM, in cooperation with the Wyoming DEQ-Water Quality Division, should continue to identify types or classes of streams that should be monitored for surface water quality impacts from oil and gas activities.
6. BLM, in cooperation with the Wyoming DEQ-Water Quality Division, should continue to identify the trends in surface water quality for impaired drainages in southwest Wyoming. This should include the determination of the relationship between oil and gas activity and the trends.
7. BLM, in cooperation with the WGFD and the USFWS, should determine if any surface water quality trends are affecting fisheries.
8. BLM should continue to ensure that the USFWS and USGS identified flood-prone areas are avoided in oil and gas development.
9. BLM, in cooperation with the State Engineers Office, Petroleum Association of Wyoming, and the WOGCC, should continue to consider and evaluate, where deemed necessary, the effectiveness of cementing and completion practices to protect aquifers, casing corrosion rates, and the casings' potential to fail and contaminate aquifers.

***Visual Resources*** (p. 31)

1. BLM should evaluate oil and gas facility visual impacts in southwest Wyoming, considering such issues as:
   - At what distance do they become unnoticeable?
   - How does density affect facility visibility?
   - Are there sensitive visual areas that should have additional protective lease stipulations?

***Wildlife*** (p. 32)

**Big Game**

1. BLM, in cooperation with the WGFD and land owners, should evaluate and identify the current status and trends of crucial winter range.
2. BLM, in cooperation with the WGFD, should evaluate the effect of oil and gas activities on big game migration.
3. BLM, should continue to support the WGFD in its efforts to evaluate the current status and trends of herd populations and factors affecting populations (e.g., climate, vegetation, hunting, habitat loss, disease).

**Raptors.** The following topics apply to bald eagle, golden eagle, ferruginous hawk, roughed-legged hawk, Swainson's hawk, red-tailed hawk, and burrowing owl.

4. BLM, in cooperation with the WGFD and USFWS, should continue to evaluate the current status and trends of nests and reproductivity.
5. BLM, in cooperation with the WGFD and USFWS, should continue to evaluate the effectiveness of setback distances to protect nesting birds. Consistent buffer zones and restriction dates for raptor nests (by species if appropriate), and winter roosting areas should be established on a statewide basis. These changes to RMPs should be maintenance actions.
6. BLM, in cooperation with the WGFD and USFWS, should continue to investigate the interrelationships between raptor reproduction, prey base, and oil and gas activity.

**Threatened and Endangered Species.** The following topics apply to black-footed ferret, swift fox, Colorado River fishes, and various plant species.

7. BLM, in cooperation with the WGFD and USFWS, should continue to identify the known locations or critical habitats of these species.

8. BLM, in cooperation with the WGFD and USFWS, should evaluate the effect of ferret search requirements on oil and gas operations. Can ferret search requirements be made more efficient? Is there justification for reducing the search requirements?

**Sage Grouse**

9. BLM should continue to support the WGFD in its efforts to identify the current status, trends, and factors affecting those trends of the species in southwest Wyoming.

**General Wildlife**

10. BLM should continue to quantify direct and indirect habitat loss by individual type of oil and gas action and cumulatively, applying the CITF and other guidelines, by habitat type or area.

11. BLM, in cooperation with the WGFD, should continue to evaluate the relationship between wildlife population changes and/or poaching levels and oil and gas-related road construction.

12. BLM, in cooperation with the WGFD and USFWS, should continue to evaluate and determine the mortality rate of avian species at various types of open pits.

**Other**

13. In sensitive wildlife use areas, BLM should work with industry to increase automation of equipment and centralization of facilities in order to reduce the number of trips to well sites.

## DATA ANALYSIS (p. 33)

1. BLM should give priority and support to bring the priority data themes identified into a digital database and ensure that the databases being used are the most current and accurate database for a particular theme.

2. As new issues arise BLM should prepare, validate and move needed data themes into a digital format.

3. BLM should continue to support the collection of nondigital data in support of issues arising in southwest Wyoming (e.g., air and water quality).

4. BLM should establish an areawide database in an ARCINFO format with a data capture scale no smaller than 1:24,000.

5. BLM should acquire digital orthophoto quads for the Great Divide Resource Area.

6. BLM should establish a schedule and budget for completing the digital database.

## MITIGATION MEASURES (p.34)

1. Working with other interested parties, BLM should develop monitoring systems for those resources where interest, risk, and available personnel resources warrant. A potential list for consideration includes:
   - Air quality
   - Crucial winter range of five big game species
   - Cultural and paleontological resources
   - Human economic and cultural systems
   - Livestock forage
   - Raptor populations
   - Recreation resources
   - Sage grouse populations
   - T & E and special status species
   - Visual quality
   - Water-related resources
   - Wild, free roaming horses

## LANDTYPE DELINEATIONS (p.35)

1. BLM should use *Delineations of Landtype Associations for Southwest Wyoming*, a scientifically based, hierarchical system of map units that incorporates ecological principles and processes across a range of scales, as the base for defining management prescriptions to achieve desired goals on the public lands.

2. BLM should host information and training workshops to explain the landtype delineation system. Simple, but constructive examples of its application should be developed and presented. Integration with GIS should be stressed.

## CULTURAL RESOURCE AUTOMATION AND CONTEXT (p. 36)

1. BLM should continue to provide support for completion of the automation of the cultural resource database and context report.

2. BLM should review existing guidance about measures necessary to eliminate or minimize proposed impacts within the viewshed of a historic trail and revise if necessary.

3. BLM should review existing guidance on avoidance/mitigation of effects to Native American sacred sites and graves and revise if necessary.

## SOCIOECONOMIC ASPECTS OF SOUTHWEST WYOMING (p.36)

1. BLM, in cooperation with the University of Wyoming and other interested parties, should develop guidelines and instructions to ensure that socioeconomic information (e.g., number of mineral-related jobs, revenues, and taxes) is included in future NEPA analysis.
2. BLM, in cooperation with the University of Wyoming and other interested parties, should develop standard methodology to assess and disclose economic effects (revenues and jobs from drilling and operation and maintenance) in NEPA analysis.
3. BLM should reference the SWRE Socio/Economic Evaluation Report for any future socioeconomic analysis prepared for any environmental or planning document in southwest Wyoming.

## CUMULATIVE IMPACT ANALYSIS

(p.36)

From its analysis of the Phase One information, BLM determined that oil and gas-related decisions in the four SWRE resource management plans (RMP) were uniformily consistent with only minor technoical differences in the application of mitigation measures. BLM concludes that its current methods and practices of both assessing impacts from oil and gas development in southwest Wyoming and complying with NEPA are reasonable and appropriate. A seperate cumulative impact assessment for southwest Wyoming is not warrented.

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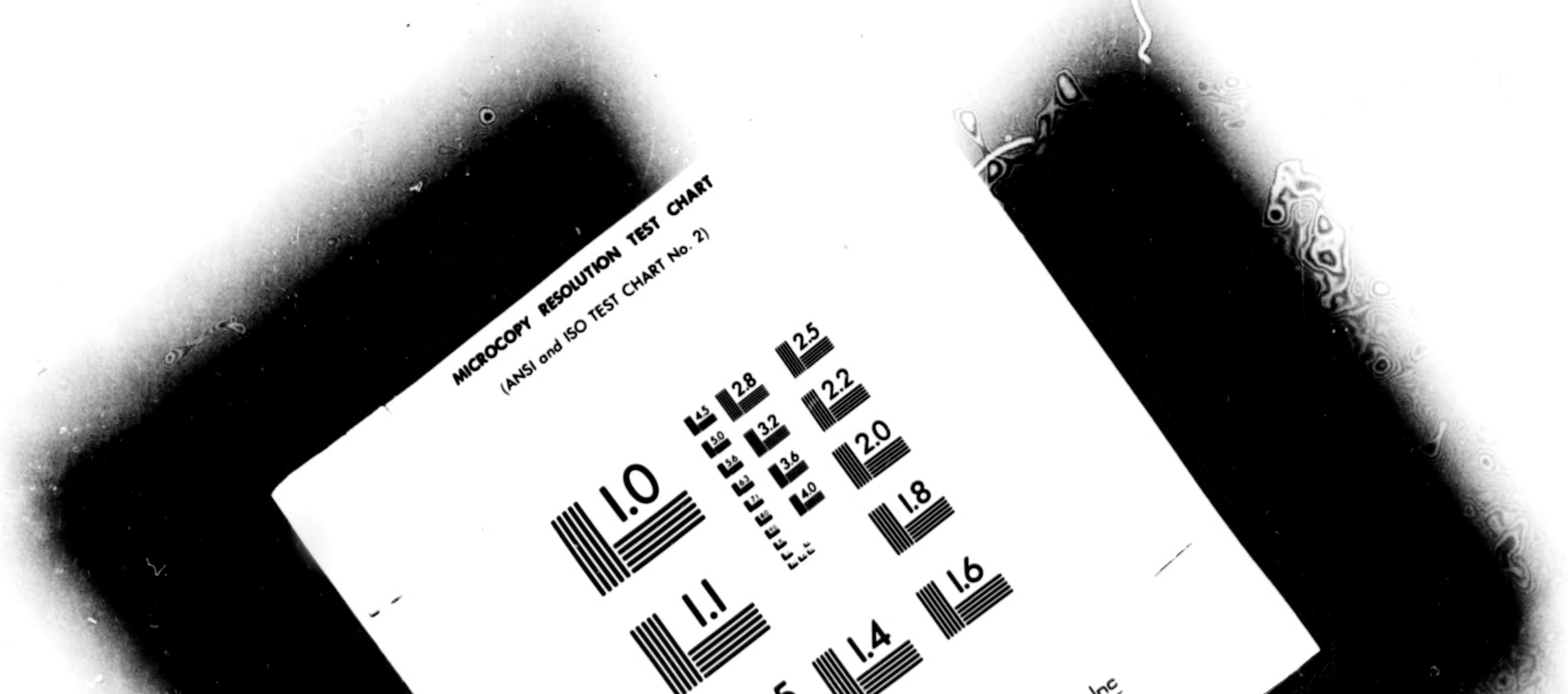
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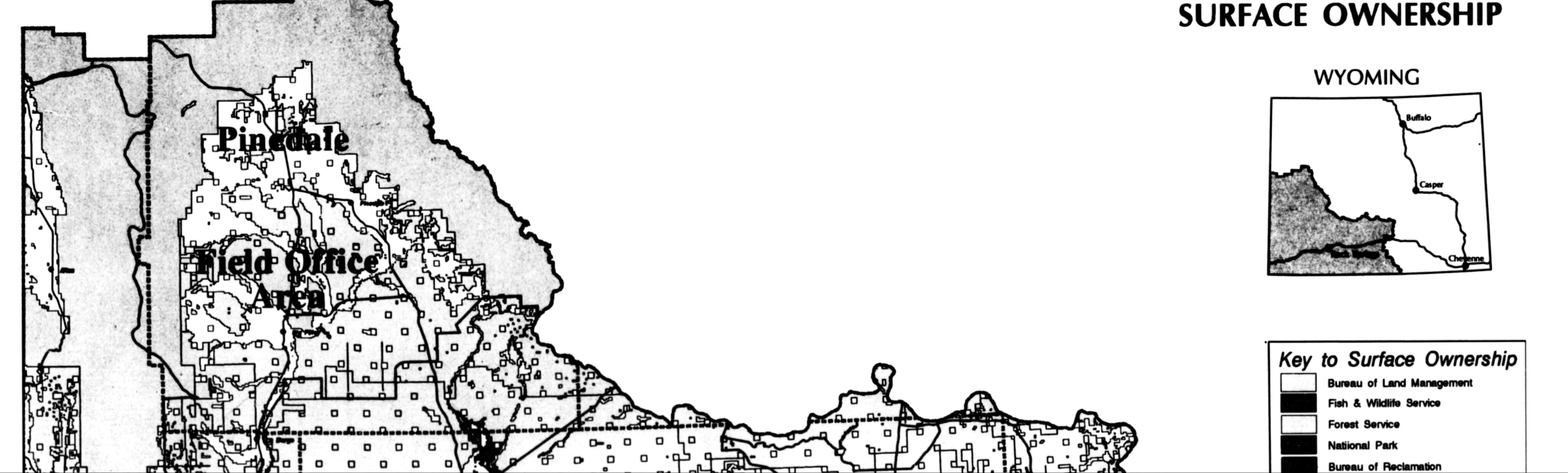
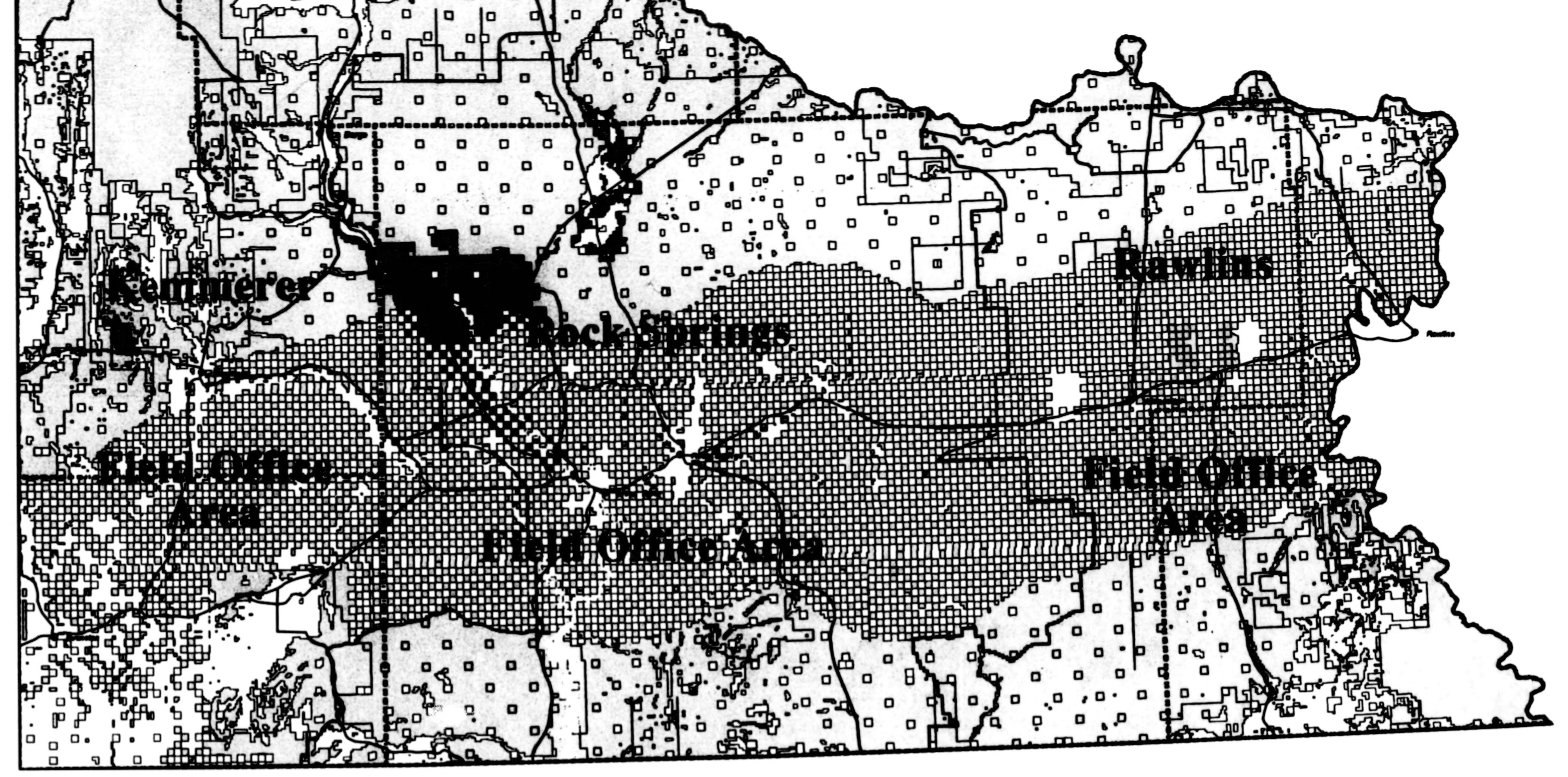
## SOUTHWEST WYOMING NEPA ANALYSIS AREA
## SURFACE OWNERSHIP





**Key to Surface Ownership**

| | |
|---|---|
| □ | Bureau of Land Management |
| ■ | Fish & Wildlife Service |
| □ | Forest Service |
| ■ | Natiional Park |
| ■ | Bureau of Reclamation |
| □ | State |
| □ | Private |

Map projection: UTM Zone 12
Map units: meters

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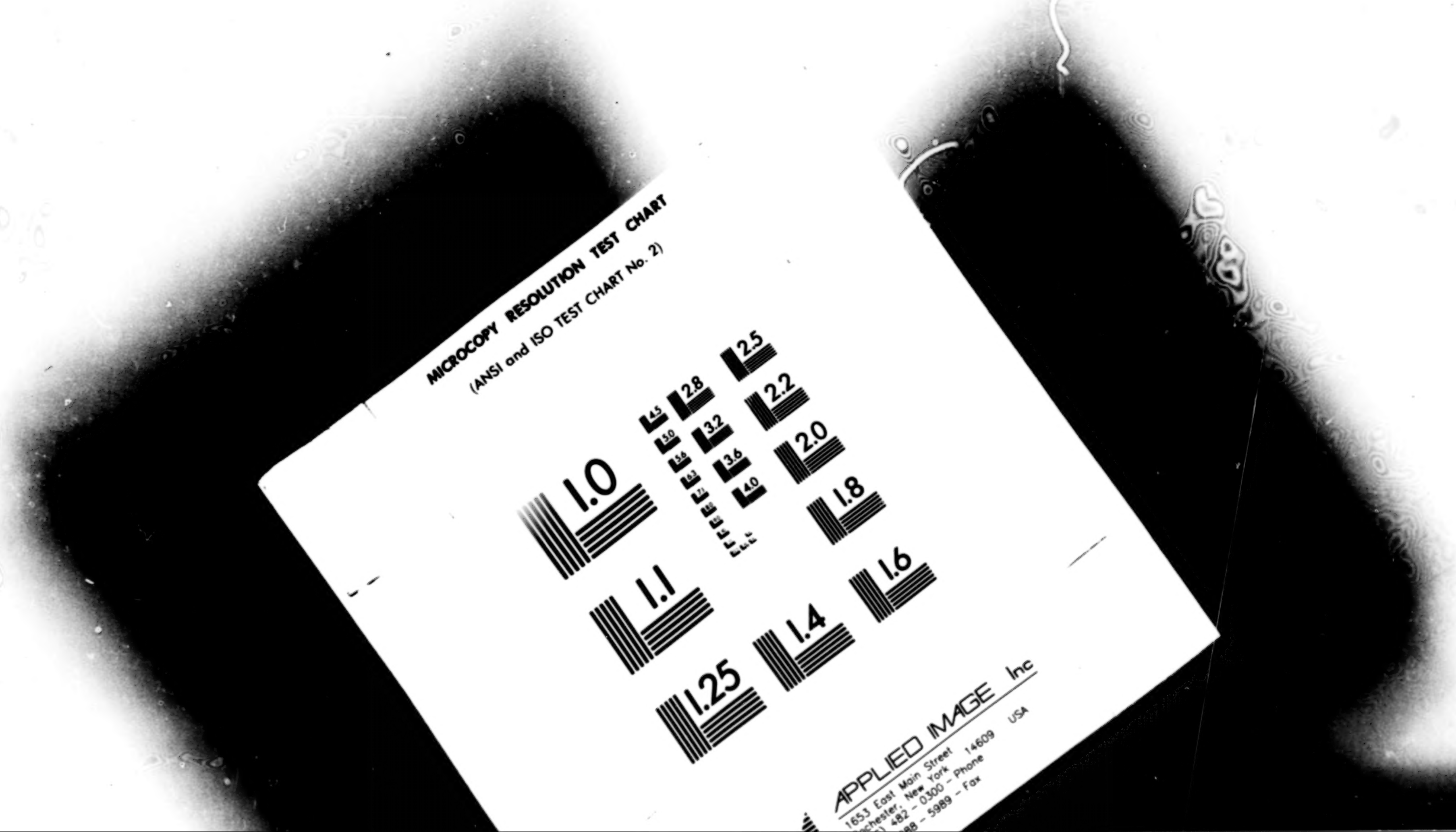
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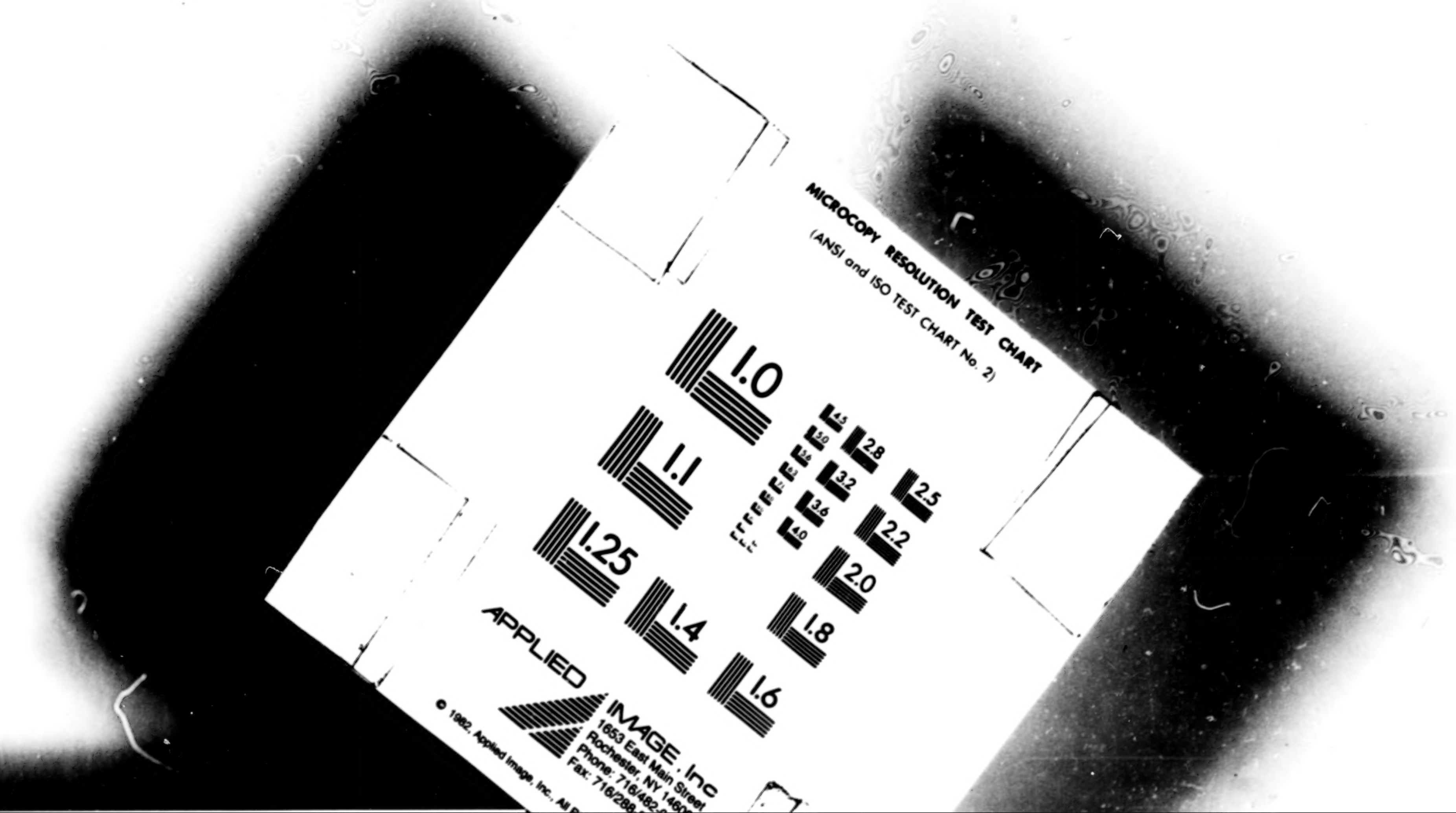
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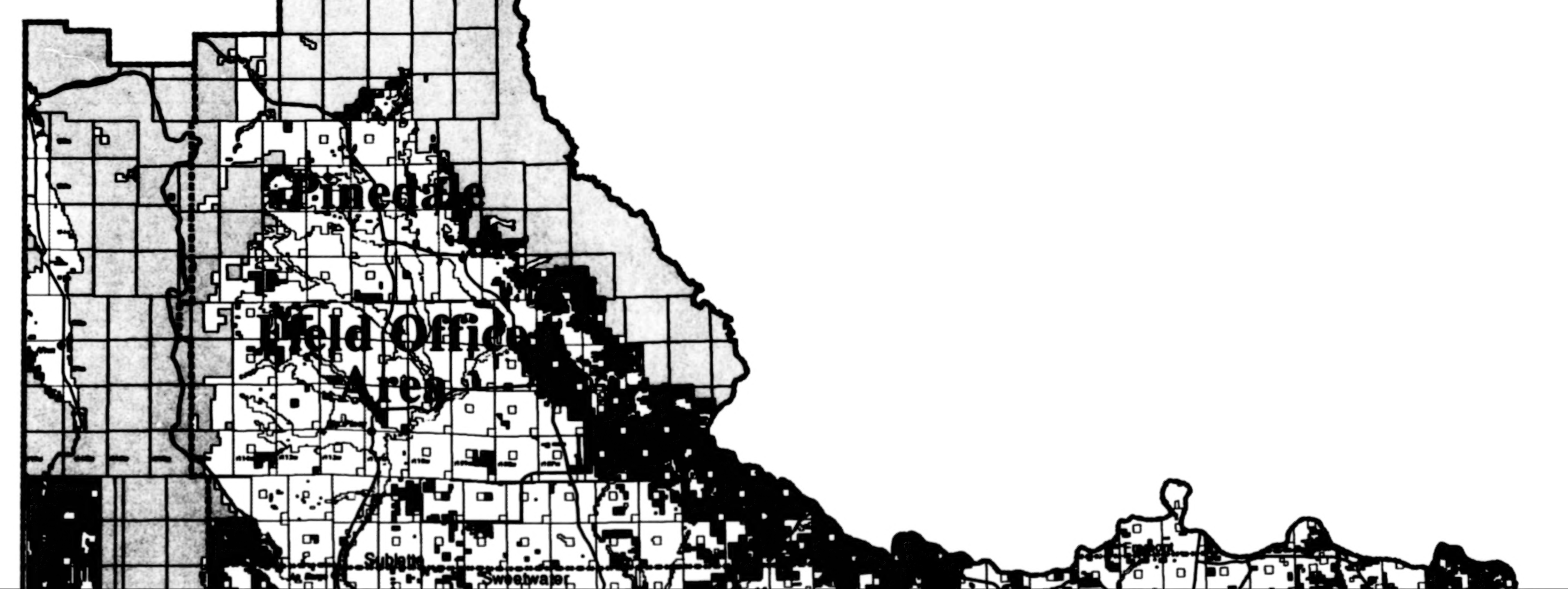
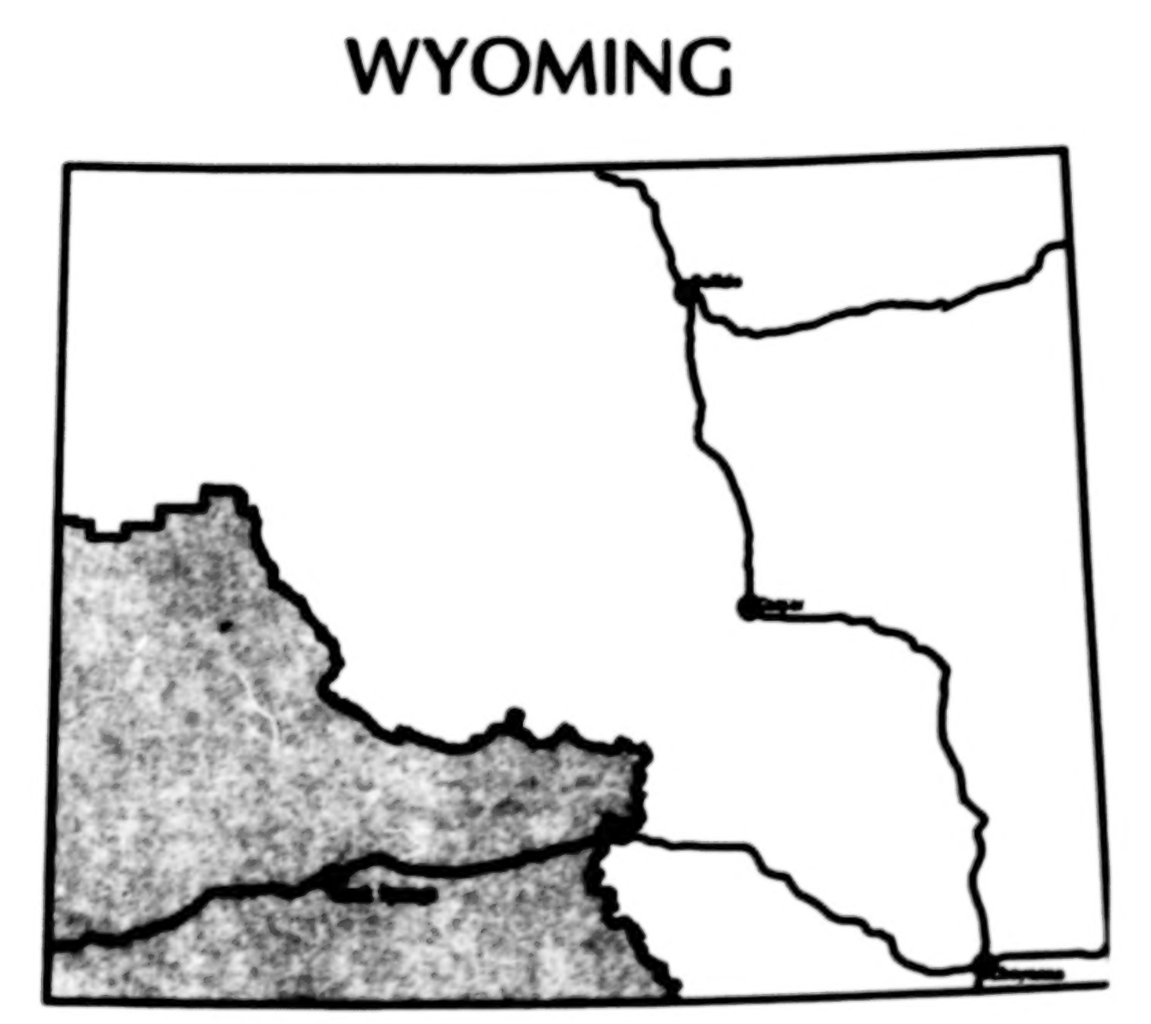
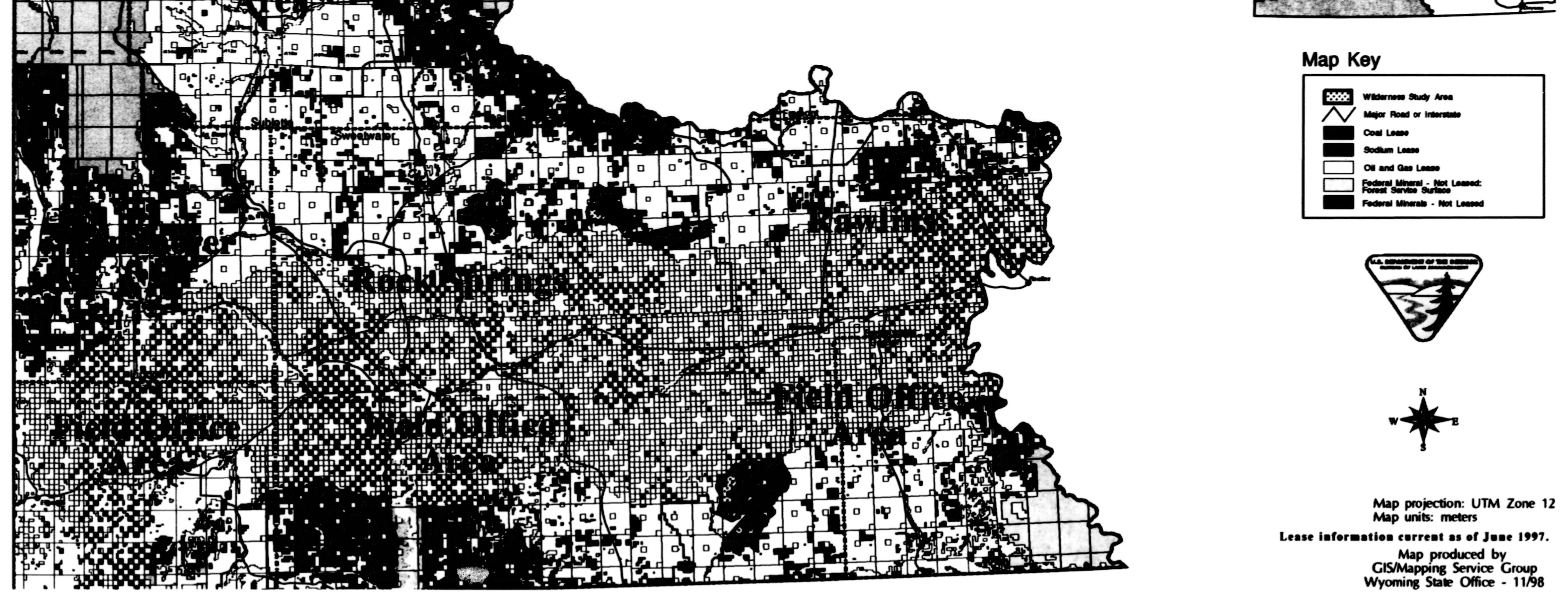
## SOUTHWEST WYOMING NEPA ANALYSIS AREA
## LEASING STATUS





**Map Key**

▨ Wilderness Study Area
╱╲ Major Road or Interstate
■ Coal Lease



Map projection: UTM Zone 12
Map units: meters

**Lease information current as of June 1997.**

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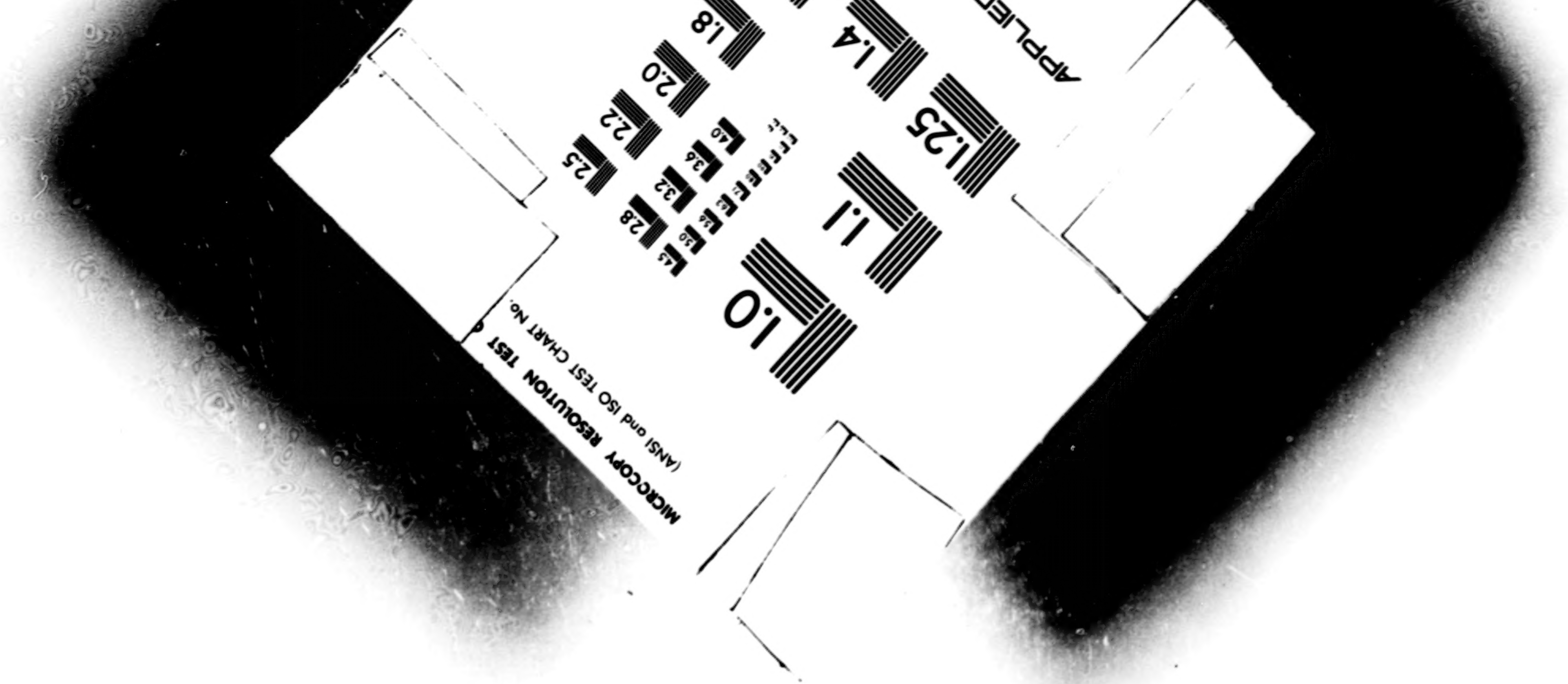
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